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Public Health Expands Its Facilities Under Title VI Federal Social Security Act*

E. R. COFFEY, M.D., F.A.P.H.A.

Surgeon, Division of Domestic Quarantine, U. S. Public Health Service, Washington, D. C.

IN 1935 the words social and security were united in a partnership that was destined to become famous when Congress passed the Social Security Act. Though the title of this Act was publicized as representing a brand new development in human affairs, in reality there is nothing new about social security—whether as an urge, as an ideal to be fought for, or as a concept for legislation.

Neither is the device of grants-in-aid new, by which our Social Security Act of 1935 functions, though some would have you believe that such grants sprang full-bodied from the brows of social security legislators in that year. Grants-in-aid have been in use as a recognized governmental device for a long time in our country and in other countries. In telling the story of their application by the United States Government, one might begin with the First Morrill Act of 1862 which was enacted to help those states and territories maintaining colleges for the benefit of agriculture and the mechanic arts. As time went on, a considerable number of other measures were passed to assist the states in one project or another. It is impossible to choose between them in offering worthy precedents to the use of grants-in-aid in public health, but I might mention the Smith-Hughes Act (1917) to assist in vocational education, the Fess-Kenyon Act (1920) to provide for vocational rehabilitation, or the so-called Oregon-California Land Grant (1916) which touched upon such diverse items as common schools, roads, highways, bridges, and port districts. All these grants—whether of 1862 or of 1935—are fundamentally similar in operation. The states must show approvable projects and the responsible federal agency must approve them.

The Public Health Service has been employing this device in carrying on its activities with the states quite regu-

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larly since 1917. In that year the Congress granted the Service $25,000 to spend in coöperating with the states on studies and demonstrations in rural health work. This relatively modest appropriation marked the beginning of our new age in public health—an age in which the federal government would work actively and creatively with the states in studying the health of the people and in carrying on programs to meet their problems. We are all proud to look back and observe the public health movement to which it is our privilege to belong, entering at this time upon a period of courageous and enlightened expansion. It defied an ancient taboo and began intensive work to control the venereal diseases. It declared that the death rate among mothers and infants was unnecessary and must be and would be reduced.

In 1935 came the federal Social Security Act with Titles V and VI constituting a public health section. They were designed to give an added—and a needed—impetus to programs already under way and to fill some of the gaps in public health activities with new programs. Title VI, which is the particular responsibility of the Public Health Service, was written " for the purpose of assisting States, counties, health districts, and other political subdivisions of the States in establishing and maintaining adequate public health services, including the training of personnel for State and local health work . . ."

We are now in the fiscal year 1941 and the public health movement has received over four years of assistance under Title VI. Funds from this title have been administered in each state to the end that public health organizations and activities might be vitalized and made more serviceable. That end has, to a great degree, been realized. There are more state-wide programs of public health in operation today than there were in 1935 when the Social Security Act was passed. New programs against particular diseases are being carried on now. More counties than in 1935 are today under the jurisdiction of whole-time health departments. There has been a stepping-up in the training and qualifications of health officers, nurses, and sanitarians—those who actually put public health into execution. For my part in today's program, I should like to highlight for you certain of these advances and to indicate the impetus given by Title VI in so far as numbers and percentages will allow one to reveal anything so intangible and far-reaching as an impetus.

These remarks must necessarily be limited to highlighting, for the subject just does not lend itself to condensation. To give you a detailed accounting of the programs alone which have fanned out through the use of Title VI funds would take hours rather than minutes. It would need to be done state by state, since not all programs are applicable to every region or every political division. I shall mention only in passing therefore the assistance given under Title VI to the problems of particular areas — such problems as malaria, trachoma, or rodent plague—and then go on to activities which are national in scope.

It might interest you to know with respect to the nation's programs of public health, including the special ones just referred to, that the funds budgeted from all sources by the states and territories for coöperative health work during the fiscal year 1940 amounted to over $83,800,000, and that Title VI contributed over $10,800,000 to this total, or nearly 13 per cent.

Part of this contribution has been directed to bolstering, encouraging, or otherwise assisting those activities which might be called public health staples. Sanitary engineering, which is fundamental to good public health whether in

the metropolis of a million souls or the crossroads community of five families; vital statistics, the index to the nation's annals of sickness and death; communicable disease control, one of the earliest forms of public health work; laboratories, the workshop for communicable disease control; public health education, which is a comparative newcomer but firmly rooted as fundamental to the aims of the new public health.

The propriety of using Title VI funds to invigorate established activities and to meet problems long recognized as belonging to public health is too obvious to need argument. But Title VI did not stop at maintaining the old and the well tried. By the very name of the Act of which it is a part, it is committed to more than that. Social security, whether of health or of something else, does not just happen. It is achieved through a combination of farsightedness, work, and faith. Title VI, as a public health division of the Social Security Act, must encourage the recognition of problems and the attempting of new tasks. I might add that the state administrators of public health have never been at a loss as to what to do next. There are so many health problems in this country that the administrators have been concerned rather with how to spread the money to take in all that was waiting to be done.

In order not to burden you with too great an assortment of figures, I am offering as evidence of expansion through Title VI assistance, a few contrasts between activities in 1935, the year which marked the beginning of the federal Social Security Act, and in 1940. In some of these heretofore untried tasks the contrast is very sharp indeed.

Pneumonia knows no sectional lines and observes no interstate quarantine. It is equally at home in the tenement or the ten room apartment. To defeat it costs money, and its depredations therefore are greatest among the financially defenseless.

In 1935 none of our states was carrying on an organized state-wide program of pneumonia control. Families dealt with the disease as a purely personal problem. They called the doctor. If the doctor called the health department, it was generally to report the disease and not to ask for laboratory or other assistance. Today 34 states have programs of pneumonia control. Budgets for 1940 amount to nearly $660,000, and 63 per cent of this represents Title VI assistance.

I would like to refer briefly to the pneumonia control program of one of our large industrial states as an example of the change in thinking that has gone on in public health and of the adoption of services that may be the direct means of saving lives.

This state, Pennsylvania, in a foreword to its program says that these activities have been undertaken to assist private physicians in giving more adequate care to pneumonia sufferers and to reduce thereby the death rate from this disease. You see the difference in thinking in that statement. To reduce the death rate is an old aim of public health. But to assist the physician directly in saving the life of his patient is a new undertaking.

It is no mere moral support that the program offers the physician and through him the patient. This state has 175 pneumonia control stations distributed throughout its territory, and these stations offer the diagnostic laboratory facilities which are so necessary in today's pneumonia control. Through these stations sulfapyridine and serum are distributed free for any pneumonia patients who are financially restricted.

Approximately 8,500 cases of pneumonia were treated during the past season under Pennsylvania's program, and possibly 15,000 patients will be treated in the year to come.

Here is a new program of which any state might be proud. And the 34 new programs in existence as compared with none in 1935 represent a splendid advance in public health.

Cancer is another disease which presents a major problem to us. You might consider public health as particularly responsible, since its activities in prolonging human life have helped to produce a population among whom cancer ranks as a leading disease. Only in recent years, however, has the problem been considered a public health responsibility, and only since the advent of Title VI has there been any pronounced trend toward programs of cancer control.

In 1935, 3 states had cancer control programs. Under the impetus of Title VI funds the number has increased to 16. The amounts budgeted from federal, state, and local sources for these programs run somewhat over $600,000 in 1940—an increase of 100 per cent over the 1935 budgets. Title VI funds are responsible for half of this increase.

State programs of cancer control are set up to include the prevention of cancer through education, state aid in treating the indigent, free tissue diagnosis for physicians, the postgraduate education of physicians, and compilation of vital statistics.

Although we are encouraged by the upward trend in these state programs, they have not as yet gone far enough to warrant a stop for congratulations. The lack of treatment facilities for those who need care is still too great. The education of the public in the ways of cancer has been going on faster than has the provision of facilities for treatment. "Find out the truth while the truth will avail you," has been the theme of that education. But treatment must be provided or the truth will still not avail.

A less spectacular but nonetheless substantial increase has been shown by programs of dental hygiene since the advent of Title VI. Our first state-wide program of dental hygiene was set up by North Carolina in 1918. Other states gradually followed until, in 1935, there were 15 carrying on this work. Title VI funds have been allocated for these activities and have helped to bring the total number of states with such programs up to 38. That is to say, between 1935 and 1940, 23 states added programs of dental hygiene.

These programs may be described briefly as consisting of education and service; the education intended for all groups and the services for those who are dentally indigent. The chief objective of a state-wide program is the development of local health department programs for carrying on such education and service.

Amounts budgeted for state-wide programs went from about $100,000 in 1935 to nearly $475,000 in 1940. This is a percentage increase of major proportions of which Title VI is responsible for about 22 per cent. The total federal share in this increase is rather higher, for the Children's Bureau also has a financial interest in these programs.

Finally, I should like to mention the expansion in programs of industrial hygiene. This activity has had an interesting and rapid rise since 1935. Concern over the accidents and illnesses occurring among employees is, of course, as old as labor itself and has arisen from both humanitarian and economic thinking. And certainly some efforts have always been going on to soften the effects of sickness among workers. The Squire's lady paying her sick calls upon the cottagers is a traditional figure, and she has had her counterpart in every land. Many employers even in the dark ages of the industrial era were alert to improve working conditions for their employees. Many of them continued to carry on their payrolls workers who were sick or

otherwise disabled. Employees themselves often took the initiative, and from their efforts came the sick benefit associations with which we are all familiar.

All these attempts to prevent illness and accidents and to mitigate their effects remained sporadic and uneven compared to the continuousness and evenness of the total problem. As the industrial age proceeded, its more enlightened folk perceived in sickness and time lost factors that must be dealt with in the same thorough fashion that raw materials were bought and markets sought out. The growing body of information on occupational diseases stimulated this enlightenment. Eventually the thinking and the efforts developed into the theory and practice of industrial hygiene. This subject rests upon the sound premise that the time lost from all types of disability is important to the worker, to the business in which he holds a job, and to the community of which he and his household form a part.

In 1935 three states had programs of industrial hygiene, and in the succeeding years 28 more have added them, so that today 31 states are carrying on this work. Industrial hygiene programs are worked out through labor agencies, physicians, and industry itself. An important feature of these programs is the direct study of working environments. Budgets for industrial hygiene went from $23,000 in 1935 to more than $500,000 in 1940, a 20-fold increase. The states which carried on these programs in 1935 had a working population of some 12 million. In 1940 states conducting industrial hygiene activities have a working population of 40 million.

Title VI has been decidedly a leader for the public health movement in this field of endeavor. Over 80 per cent of the expansion in budgets has come through the use of Title VI funds.

I hope that the details I have chosen have given you a clear outline of the pattern of Title VI distribution—the assistance in meeting localized health problems, the impetus given to old, established state-wide public health programs, and the development of many new programs to combat some of our great illness problems.

I should like next to turn to another aspect of Title VI assistance and show how this provision of the Social Security Act has been used to strengthen the mechanism of public health. Mechanism is a severely impersonal word to incorporate such vital personal elements as health officers, nurses, and sanitarians, but it is a good compact word to signify the structure of public health, the health departments and their workers.

The local health departments which function down where the problems grow are the basic units of public health in this country, and they are rather varied units in point of organization. Some of them might be described, with malice toward none, as rudimentary, since they consist of part-time personnel uneducated in public health and frequently quite naive about its complex processes. Above these are the health departments which technically conform to definition in that they are manned by qualified public health personnel, but which are obliged to run under so limited a budget that their programs are only skeletons of what they should be. And so on up the line to those relatively fortunate departments with budgets that provide facilities almost adequate to cope with the problems of the community.

Title VI funds have been put to excellent use by the states in building up and strengthening local health organizations. Over-all evidence of what has been accomplished since the Social Security Act came into existence may be found in the 1,577 counties now under full-time health departments as against the 762 counties in 1935.

TABLE 1

Growth in Full-time Local Health Units *
1935–1940

	Number of Units		*Increase*	
	1935	*1940*	*No.*	*Per cent*
Single County Units	486	655	169	34.8
Local District Units	41	122	81	197.6
State Supervised Districts	34	106	72	211.8
Total	561	883	322	57.4
	No. of Counties Covered		*Increase*	
	1935	*1940*	*No.*	*Per cent*
Single County Units	486	655	169	34.8
Local District Units	124	356	232	187.1
State Supervised Districts	152	566	414	272.4
Total	762	1,577	815	107.0

* Based upon budgets submitted by the states to the U. S. Public Health Service

According to the budgets submitted by the states to the Public Health Service, the amounts budgeted for local health services from federal, state, and local sources have gone from around $7,500,000 in 1935 to over $17,000,000 in 1940. This represents an increase in moneys available for local health services of around 129 per cent. About 40 per cent of this expansion in budgets may be traced to Title VI funds.

These 815 more counties with full-time health services offer an encouraging picture to public health administrators, especially to those who have been following the growth of county health departments since their beginnings in 1911.

I suspect, however, that some of you might wish to ask whether this increase means that there are 815 more county health departments than there were in 1935. The answer is, no; and that brings us to the trend in types of local health organization.

The number of single county health departments has gone from 486 to 655 in this time, an increase of nearly 169, or 35 per cent. This represents, however, only a small portion of the expansion. It would seem that the single county unit is giving way to the plural form in which two or more counties combine their resources to organize a health department. This type of unit increased from 41 in 1935 to 122 in 1940. Each of these covers two or more counties, and the increase in counties covered therefore runs quite high—from 124 to 356, or approximately 188 per cent.

But the really significant trend during these few years in the expansion of full-time health service has been the growth of the so-called state supervised districts. The form of these districts varies somewhat. There are some that seem to be a decentralization of the state health departments. Others, to all outward appearances, are essentially local health departments. The common characteristic uniting all these state-supervised districts is that the costs are borne by funds independent of local contributions. Since 1935 the number of these districts has risen from 34 to 106 with an increase in counties covered from 152 to 566, or approximately 272 per cent.

Another factor of the expansion in public health services is the marked

improvement in the quality of personnel. Quality is indispensable in carrying health to the public whether as a subject or a service. Much of our health work depends for its effectiveness upon the ability of the medical officer, the public health nurse, and the sanitation worker to deal in an intelligent and professional way with the public. Our national legislators recognized this and also that an expanding public health program would demand additional well trained personnel. They therefore wrote into the purpose of Title VI the phrase I have already quoted "including the training of personnel for state and local health work."

employees. The proportion of nurses among the trainees is greater than their proportion among public health personnel as a whole, while the converse is true of sanitation workers.

This discrepancy indicates that some thought could very profitably be given to relative balance when selecting personnel for training since these professional groups are all highly important to public health work. It is obvious that a sound training program should extend about the same proportion of opportunities for advanced training to one group that it does to another. Table 2 does show, in fact, that the proportion of nurse trainees

TABLE 2

Distribution of Trainees by Year and by Professional Class
1936–1940

Year	Total	Professional Class							
		Physicians		Nurses		Sanitary Personnel		Others	
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
1936	513	20	3.9	471	91.8	19	3.7	3	0.6
1937	774	58	7.5	648	83.7	57	7.4	11	1.4
1938	1,869	310	16.6	1,186	63.4	265	14.2	108	5.8
1939	928	226	24.3	503	54.2	123	13.3	76	8.2
1940	1,094	285	26.1	626	57.2	107	9.8	76	6.9
Unknown	241	68	28.2	105	43.6	55	22.8	13	5.4
All years	5,419	967	17.8	3,539	65.3	626	11.6	287	5.3

Since 1936 the state and territorial health departments have authorized the training of 5,419 trainees, 80 per cent of whom had their expenses defrayed, in whole or in part, out of Title VI funds. Nurses made up 3,539 of this number, medical officers 967, and sanitation personnel 626. The remaining 287 were individuals in the various other classifications. The distribution by professional class does not exactly correspond to the distribution by professional class of public health workers at large, as estimated by a study * of public health

has gone down, but this decrease has been more than balanced by the increase in medical trainees, with the result that the small proportion of sanitation personnel trained has shrunk still further.

In the beginning, the state health officers had the task of getting a hurried program under way to meet the immediate demand for trained personnel brought about by the expanding health program. There are, of course, exceptions to most generalizations, but I think it is safe to say that a person without the proper preliminary education and practical experience will take on advanced public health training only as a sort of superstructure. It will

* Derryberry, Mayhew. Educational Qualifications of Staff Members in Health Departments. *A.J.P.H.*, 30, 6:645 (June), 1940.

add to his knowledge, of course, but he will have difficulty in turning it to practical account. In this respect a tremendous amount of credit must be given to state health officers for exercising a stricter choice each year in the selection of trainees on the point of basic education and experience.

This more careful selection of trainees has become increasingly evident from year to year. In 1937 there were quite a number of nurses and an even greater number of sanitation trainees who reported that they had not finished high school. In 1940, however, practically all trainees in both these groups claimed high school graduation. As to post-high school training, it can be assumed that all medical officers and nurses have been graduated from their respective professional schools. In 1937, however, a large proportion of the sanitation trainees had never attended college, while in 1940, three out of every four of the sanitation trainees selected claimed a college degree. Thus, it may be said that as a whole the trainees selected by state health officers now are basically well trained and are in a position to capitalize on advanced public health training. I am sure that you will all agree on the propriety of this trend, since advanced public health training should be a process of making a specialist of one who is already a professional. Eventually it will be just that. On the basis of present trends, we may judge that in a very short time all trainees will be graduates of professional schools.

This concludes my report of the several years of endeavor under Title VI, the public health section of the Social Security Act. I hope it merits your approval that Title VI has been used to promote established activities and to lead public health into new paths toward more ambitious objectives. The fact that it operates through the use of grants-in-aid means that much material assistance can be given to the states and through them to their subdivisions without detracting from the responsibility, the judgment, or the authority of the local people.

Schistosome Dermatitis as a Bathing Place Problem*

JOHN E. MILLER, C. E.

Assistant Engineer, Michigan Department of Health, Lansing, Mich.

SCHISTOSOME dermatitis or swimmer's itch, as it is commonly called, is a parasitic infection which indirectly may be considered as a public health problem. The dermatitis is of a type that will not spread from person to person, and fortunately it differs from bacterial infections in that it is not contagious. There is, however, a problem when one considers it from the angle of secondary infections; particularly so when serious cases have been irritated to the extent of producing open lesions.

The purpose of this discussion of swimmer's itch is to give, in a general way, the cause, the distribution, the conditions favoring it in Michigan, the history of that state's activities with relation to it, and the problem.

THE CAUSE

Water itch is caused by the penetration of the larvae of certain species of parasitic worms called schistosomes through the skin of man. The life cycles of some types of schistosomes are known and it can be deduced that the closely related schistosomes causing water itch probably have the same general type of life cycle. A brief outline of this cycle will illustrate the various stages of development of the schistosome causing swimmer's itch. The adult worms apparently live in the abdominal veins of muskrats, mice, gulls, terns, ducks, grebes, and possibly other water birds. The eggs produced by the female worm break through the intestinal wall of their warm blooded host and are voided with the feces, generally into water. The embryo which hatches from the egg swims about and if it encounters a snail of the right kind and age it actively penetrates into its liver. The embryo grows into a long sac-like structure which produces within its body a brood of individuals resembling itself. These emerge from the parent sac but remain in the snail. The members of this generation, over a period of 4 to 6 weeks, produce a large brood of young parasites of quite different nature. This generation are the Cercariae which cause swimmer's itch. These larvae are provided with a forked tail for swimming in water and also a special penetration organ with special glands for use in working a way out of the parent and out of the snail into the water. Finally, after a short period of swimming in the water, the Cercariae by means of these penetration organs actively bore through the skin of any warm blooded animal with which they come in contact. If this animal happens to be the normal host the parasites complete their life cycle.

* Read before the Engineering Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

Man is an abnormal host to these free swimming parasites, but the Cercariae are unable to differentiate between the various warm blooded animals. If they come in contact with the skin of man they will penetrate and attempt to establish themselves. They find themselves, however, in an unsuitable place and die.

They do not penetrate far beyond the skin of man but their presence immediately under the skin produces an irritating, itching sensation. The itching becomes intense but is seldom more serious than that produced by chiggers and usually subsides in 4 to 7 days. Man is not the only sufferer because infections of dogs and horses have been observed also.

DISTRIBUTION

After the cause of water itch became known, reports from various parts of the world indicated that the nuisance was not confined to Michigan. In the past 10 years it has been reported from 11 states in the United States, several Canadian provinces, England, and various parts of Europe. On this continent most of the trouble is encountered in the northern midwestern states and the central provinces of Canada. Recent surveys show that Michigan has a generous sprinkling of infested areas. Interviews with "oldtimers" also indicate that it is not a new thing in the history of the state but that it was known as a weed itch at least as far back as the lumbering days. The widespread knowledge of the cause of water itch during the past few years and the increased use of Michigan as a summer resort area has resulted in a marked increase in the number of reported cases and the areas affected.

THE PROBLEM IN MICHIGAN

Michigan, with its great number of beautiful lakes of all sizes in all sections of the state, provides ideal facilities to tourists and users of resorts. These lakes in the northern part of the state usually contain exceptionally clear and clean water, and along a large proportion of their shore lines there are protected sand beaches and shallow water over sandy bottoms. With such facilities, these lakes make ideal swimming places. Unfortunately these same swimming places are the locations at which snails of various species make their home and thrive in large numbers from year to year. The species of snails that produce the Cercariae causing swimmer's itch are superior in numbers at these beaches.

It appears that one outstanding factor in this problem is bird migration at various seasons. The continued development of lakes in northern Michigan as wild life refuges has increased and will continue to increase the wild bird population which, following the usual migratory habits of birds, will result in more infected snails and beaches. Also, increasing the percentage of infected snails will bring about an increase in the number of cases of itch as well as in the intensity of infections.

Weather is another factor which plays an interesting part in the series of events. The northern part of Michigan generally has mild and relatively cool weather until the latter part of June or the first part of July. During the following four to six weeks or longer, the hot summer weather and the bright sunny days produce an ideal water temperature for swimming and this brings the beaches into use. It is at this same time unfortunately that the Cercariae in the snails develop into free swimming larvae and emerge to do their damage.

HISTORY OF THE STATE'S ACTIVITIES

For a number of years prior to the summer of 1938, the Michigan Department of Health received numerous complaints each summer about a water itch at bathing places. These were generally

answered by stating what caused the itch and that such areas of any lake so infected should be avoided. In the summer of 1938 complaints were numerous, and in view of the growing seriousness of this problem an investigation of several seriously affected lakes and beaches was made. Information was secured about the itch and what had been or could be done to control it. Following this investigation several beaches were treated with some success.

During the spring prior to the 1939 summer season, the several interested state departments decided that one of them should take some active steps toward a systematic investigation of all complaints, study the problem, and devise means of employing a simple, cheap, and satisfactory method of eliminating or controlling schistosome dermatitis. The Michigan Stream Control Commission was allocated funds for such a program. At the beginning of the 1939 season, that Commission organized a field party consisting of a biologist who was in charge of the party, a chemical engineer, a member of the Institute for Fisheries Research, an assistant sanitary engineer, and two field assistants. This party was equipped with a mobile laboratory, transportation with a house trailer, a powered boat and trailer, necessary chemicals for research and control, and other minor equipment deemed necessary for such an undertaking.

The three months of summer activities of this party yielded some valuable and useful information. A number of beaches were also successfully treated. Generally following complaints, 139 beaches in the upper peninsula and the northern half of the Lower Peninsula

Swimmer's Itch

were thoroughly examined. Reports of dermatitis came from some 20 other beaches, but lack of time prevented the party checking on them. Of the 139 beaches visited, 58 were found infested with schistosomes, leaving 81 that apparently were not troubled with them during that summer. Of the 58 beaches found to be infested, 25 were given some type of treatment in an attempt to kill the snails. This left 33 beaches known to have been infested or reported as such that were not treated. The investigations indicated that the intensity of the infestation varies with each season and that the 1939 summer was one of moderate infestation if based on past University of Michigan Biological Station observations.

At those beaches which were treated, chemicals were used in different concentrations, applied in several ways, and tried under variable conditions. The hand sowing of pea-coal-size crystals of copper sulfate gave fair results in some areas. Finely powdered copper carbonate was reasonably effective but was difficult to handle. Dissolving copper sulfate "snow" in a large drum of water and then pumping this solution out through a T-shaped pipe that was pulled along the bottom proved to be ineffective. A mixture of copper sulfate "snow" and copper carbonate powder in water gave better results than either one of the copper compounds alone. Copper stamp sand appeared to be effective only after it had a chance to act on the snails over a long period of time.

The conclusion from this work was that the most effective means of control involved the use of a mixture of copper sulfate and copper carbonate in the following manner: After a beach had been examined for the location of snail beds, the extent of the area to be treated was decided upon. For example, if the beach and adjacent areas to be treated were 800 ft. long and the snails were found 200 ft. from shore, the total area of 160,000 sq. ft. would be marked with stakes. The average beach should receive 2 lb. of copper sulfate and 1 lb. of copper carbonate per 1,000 sq. ft. Therefore, in this case 320 lb. of copper sulfate and 160 lb. of copper carbonate would be needed. During the summer of 1939 these quantities could be purchased for about $50. A practical method of treatment in the field consisted of making a solution of the two chemicals in the proper ratio in a 60 gal. barrel in a boat and siphoning the mixture out of the barrel through two lengths of garden hose, one on each side of the boat, with the ends dragging on the bottom. A 60 gal. mixture consisting of 50 lb. of copper sulfate and 25 lb. of copper carbonate should treat 25,000 sq. ft. This method of treatment was found to be very effective, provided the application was carried out on a calm day and even distribution of the strong chemicals over the bottom thereby secured. No control treatments should be made before the latter part of June because of the possible deleterious effect on fish, particularly spawn. Otherwise, no damage to fish was detected.

During the 1940 summer season, the Michigan Stream Control Commission supplied those interested in this problem with a pamphlet on water itch, and later, if requested and needed, investigations were made and technical assistance given. For field work, the party consisted of two biologists and one assistant sanitary engineer, all of whom had had previous experience with control of this problem in affected areas, and were familiar with the research program designed to bring to light simpler and less expensive control methods. Studies during this summer revealed it to be the worst season on record.

Areas previously not reported or known about were found to be heavily infected. Some areas which had been

treated and a reduction in snail population secured, were again found to be infected to the point of being a nuisance. The cause of this, however, was the high percentage of infection of the few remaining snails or from Cercariae migration from adjoining areas not previously treated.

The number of reports and requests for assistance came from approximately 1,000 sources. Two hundred and forty investigations were made and 180 beaches were found to be infected. The number of beaches treated was 61 and relief was obtained from the itch at every beach treated. During this past season the state did not supply the necessary chemicals, treatment equipment, or labor since this was the rightful duty of the property owners receiving the benefits. The studies made in conjunction with the summer's activities did not reveal any additional research information other than that it was more practical to hand-sow pea-coal-size copper sulfate crystals in shallow water (1½ ft.) than fuss with the solution application method.

PROBLEM OF THE FUTURE

As already pointed out, it is quite evident that Michigan will continue to have an increase in the number of infections with swimmer's itch because of the various factors favoring its development. The present method of control which consists of killing the host snail of the Cercariae appears to be the proper method of attack.

The chemical control now being used is very effective under favorable conditions. However, it is still hoped that an easier, simpler, and less expensive method of killing the snails can be found.

Additional research on the life cycle of the Cercariae causing the itch, as well as on control methods, is necessary, if the best practical solution of this problem is to be obtained.

The Community Health Education Program

The Hartford Plan

Audio-Visual Unit

BENJAMIN G. HORNING, M.D., F.A.P.H.A.,* LUCY S. MORGAN, PH.D., F.A.P.H.A., BEATRICE HALL KNEELAND, F.A.P.H.A., AND ALICE H. HAMMAR

Formerly Health Officer, Hartford; General Secretary, Hartford Tuberculosis and Public Health Society; Nutrition Director, Connecticut Dairy and Food Council; and Supervisor, Works Projects Administration Project, Hartford, Conn.

THE Hartford Plan for Community Health Education which was begun during June, 1938, was discussed in a recent paper.[1] It was the first organized effort of official and nonofficial agencies in Hartford to coördinate their health education activities into a city-wide program, and it was pioneer work in a comparatively new field. The program was built around individual and community needs, and was centered about such agencies as community houses, schools, churches, and health guilds.

The first year's program created widespread interest and reached many groups and individuals in the city. It was a valuable experience and served as a guide in planning a Five Year Health Education Program, which was begun during September, 1939. The city has been decentralized into 12 health education districts, and the emphases of the program are placed on (1) Institutes for Leaders, (2) Methods Demonstrations in Schools, (3) Research, and (4) Public Relations.

The function of a health education program is to interpret knowledge concerning medicine and the related sciences to individuals in such a way as to motivate them to attain the maximum in health and welfare. To accomplish this, it is necessary to develop suitable teaching methods and technics with which to reach groups and individuals of various intellectual endowment, and educational and racial background. Since such mechanical media as the motion picture, radio, exhibit, and printed matter are indispensable in such work, one of the objectives of the Hartford Community Health Education Program is to provide the community with suitable audio-visual equipment and materials.

A survey was made of audio-visual material for health education, available from national, state, and local sources. Films, filmstrips, electrical transcriptions, exhibit material, and printed matter were reviewed from many parts of the country and such material as was suitable for use in the community was purchased or borrowed. The Connecti-

* Now Associate Field Director, A.P.H.A.

cut State Department of Health, the Dairy and Food Council, and the Metropolitan Life Insurance Company were valuable sources of audio-visual health education aids.

The results of the Visual Health Education Material Survey have been compiled into a catalogue under such types of mechanical media as (a) films, (b) projection slides, (c) exhibits, (d) posters, (e) charts, (f) plays, and (g) printed matter. The material is listed under the following subjects: (a) adult health, (b) child hygiene, (c) dental hygiene, (d) communicable diseases, (e) housing, (f) laboratory, (g) maternal hygiene, (h) nutrition, (i) safety, (j) first aid, (k) sanitation, (l) tuberculosis and (m) venereal diseases. A brief description of each item is given. For example, the subject matter of a film is described, the showing time is noted, the agency from which it may be obtained is given, and the type of group for which it is suitable is suggested.

The Board of Health and the Tuberculosis and Public Health Society each purchased sound motion picture apparatus, talking disc film projectors, delineascopes, and other mechanical equipment. A central clearing bureau was established and equipment, operators, and mechanical media such as exhibits, films, and printed matter were made available to the entire community.

In order to assist local agencies in producing visual education material with local significance, the Board of Health is sponsoring a Works Projects Administration project. It supplements the work of existing agencies by making exhibits; taking pictures; making projection slides; manufacturing such exhibit aids as pamphlet racks, bulletin boards, and easels; transporting and setting up equipment and exhibits; showing films; writing publicity; keeping statistical records; and doing clerical work.

The personnel of the project usually consists of (a) supervisor, (b) commercial artist and assistant, (c) carpenter and assistant, (d) photographer, (e) motion picture operator, (f) publicity person, (g) utility man (h) statistical clerk, (i) mimeograph clerk, and (j) health record clerk. The floor space and office equipment are provided by the Board of Health. The cost of material used in making exhibits is borne either by the city or the agency for whom the exhibit is made. Transportation of exhibits has been furnished by city-owned truck or private automobile.

The health exhibit is being widely used in Hartford as a means of presenting health problems to the community. It is a type of mechanical medium designed to reach large numbers of persons, with the objective of transforming indifferent masses into interested individuals. Important sources of exhibit material have been the U. S. Public Health Service, the National Tuberculosis Association, the American Social Hygiene Association, the Metropolitan Life Insurance Company, the Aetna Life Insurance Company, the Connecticut State Department of Health, and the Dairy and Food Council. The most valuable exhibits have been those produced locally and having local significance. Such exhibits represent the combined efforts of state and city leaders with the staff of the WPA project.

In planning exhibits certain general principles are followed. The story is told with a few correlated facts. Simplicity of design with emphasis on color and motion is stressed. An effort is made to visualize the information in a manner suitable to the intellectual and educational levels of the individuals to be reached. The person requesting the exhibit presents the idea with factual material to the visual education supervisor. Various plans are discussed, consideration being given to message of exhibit, place to be displayed, persons

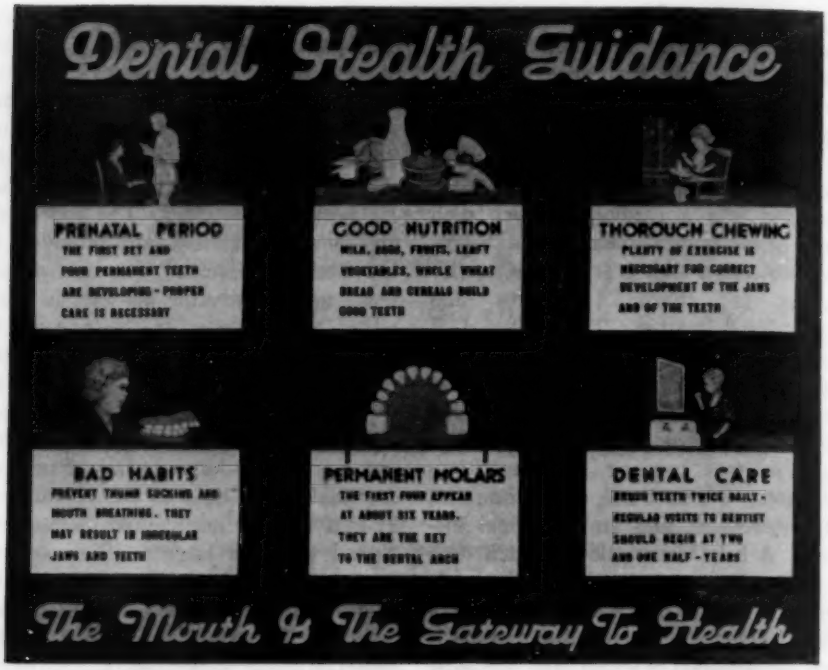

PLATE 1

to see exhibit, method of transportation, size, colors and cost. When a plan has been agreed upon, the supervisor discusses it with the artist, who interprets it in colored sketches. The sketches, including copy, are shown to authorities for criticism. The plans are then presented to the artist, carpenter, and other technical assistants for execution. Several conferences are often necessary before the exhibit is completed.

The length of this paper does not permit detailed description of all types of visual education aids used in Hartford, but certain exhibit material produced locally will be described briefly. Typical of the smaller exhibits is, "Dental Health Guidance" (Plate 1). The back board is made from $\frac{3}{8}$" plywood which is treated with several coats of shellac before painting. This wood is used extensively because it does not warp and will stand the necessary handling involved in frequent transportation. One-eighth inch plywood is used for the small pictures which are glued to the exhibit; $\frac{1}{4}$" plywood for titles and cut-out letters. It has been found from experience that screws as well as glue are needed because changes in temperature and transportation frequently reduce the strength of the glue. Cardboard cut-out letters were used for the subtitles in this exhibit. They can be purchased in various sizes and can be made effective when dipped in shellac and then painted to harmonize with the colors of the exhibit. Varnished, gummed letters which can be purchased in various sizes were used for the captions. The background of this exhibit is Italian blue, with the captions and the smaller cut-out letters in a shade of the same color. The caption panels are canary yellow, and the gummed letters black. Artist's oil paints were used for the cut-out pictures.

The "Food Wheel" (Plate 2) is an

excellent example of the three dimensional type of exhibit. It was made at the request of a member of the staff of the Connecticut State Department of Health, and suggests that the food dollar be divided into fifths to get the best returns in health. There are 27 models on the wheel which are hand-carved from white wood and painted in oils to give a realistic effect. White wood has been found especially good for small objects and for moldings and casings where extra thickness is needed. This exhibit has proved so popular that it has been necessary to make three duplicates.

Two large exhibits have been executed. One is called, "The Story of Syphilis." It consists of three panels each 3′ x 9′ hinged together and light enough to transport in an automobile. The background of ¼" plywood is painted a two-tone gray with lettering in light cream color. The center of interest is a reproduction of Columbus's flagship depicted in blue with accents of red. There are poster cards with factual material and photographs on the side panels. The title of the other large exhibit is, "Tuberculosis Is Preventable" (Plate 3). The letters are in red and blue. The center of interest is a black

PLATE 2

PLATE 3

photostatic map of Hartford on which all cases of tuberculosis in the city are located by means of colored map tacks. A model of "Little Red," Dr. Trudeau's cottage, carved out of wood is placed above the map. A clinical case of tuberculosis supervised by the Board of Health Clinic is presented by photographs which show various stages of diagnosis, treatment, and rehabilitation of the patient.

Since March, 1938, in addition to exhibits borrowed or produced independently by local agencies, the WPA project in coöperation with local leaders has completed 23 exhibits. The plans and specifications, cost of material, and execution time have been carefully cal-

EXHIBITS PRODUCED

No.	*Subject*	*Size*	*Cost*	*Places Exhibited*	*Attendance*
1	Dental Health	43″ x 50″	$6.07	2	166
2	Dental Health Guidance	38″ x 48″	7.06	6	3,186
1	Housing	36″ x 144″	4.50	5	6,836
1	Pathogenic Bacteria	8″ x 14″ x 48″	7.91	4	710
2	Baby's Formula	34″ x 47″	5.53	15	2,640
1	Well Child Conference	38″ x 28″	5.44	8	1,350
1	Nutrition Exhibit	84″ x 12″	18.55	5	6,430
1	Nutrition Exhibit	12″ x 36″ x 108″	23.95	22	15,680
2	Your Food Dollar	30″ diameter	5.70	55	17,717
2	Your Food Dollar	32″ diameter	5.70	47	19,915
2	Vitamin Exhibits	30″ x 40″	4.70	38	18,093
2	Ragweed Eradication	70″ x 33″	7.06	8	7,125
1	Ragwood Eradication	45″ x 56″	9.26	5	2,900
1	Congenital Syphilis	38″ x 24″	4.61	15	2,456
1	Story of Syphilis	84″ x 108″	13.47	16	19,770
1	Tuberculosis	84″ x 108″	34.10	19	18,951
1	Negro Health Guild	72″ x 32″	7.00	2	1,075
23				272	145,000

culated and placed on file so that the exhibit can be duplicated at any time. During the past 12 months the 23 exhibits have been seen by 145,000 persons. This figure does not include window or bulletin board displays, or exhibits in buildings where it was impossible to keep a record of attendance.

The Community Health Education Program has made extensive use of colorful posters. They have been used to illustrate various health activities, and have been made for such national occasions as Child Health Day, Social Hygiene Day, Negro Health Week, Dairy Month, Early Tuberculosis Diagnosis Campaign, and others. They have been planned so that they can be duplicated by the silk screen process and, since November, 1938, a total of 1,667 posters concerning 20 subjects have been made. The cost of material per poster including silk screening has ranged from 5 to 20 cents.

POSTERS PRODUCED

Subject	*Size*	*Number*
Cancer	14" x 22"	80
May Day, 1939	14" x 22"	200
Child Health Services	14" x 22"	100
Your Child's Chances for Health	22" x 44"	235
Baby's Sun Bath	22" x 28"	1
A Baby's Day	24" x 32"	2
Prevent Diphtheria	14" x 19"	200
The Diseased Tooth	20" x 26"	1
Healthy Teeth	20" x 26"	1
We Brush Our Teeth	11" x 26"	2
Housing	20" x 24"	3
National Dairy Month	14" x 22"	200
Negro Health Week, 1939–40	14" x 22"	200
Nutrition	20" x 40"	1
Ragweed Eradication	22" x 28"	210
Syphilis, Charts and Posters	25" x 32"	5
Tuberculosis Campaign	14" x 22"	200
Special Health Meetings	18" x 30"	12
Communicable Disease Charts	36" x 40"	4
Educational Charts	24" x 30"	10
Total		1,667

The graphic presentation of statistical material has been an interesting and useful part of the program. Statistical data which have accumulated at the Board of Health and other agencies are tabulated, analyzed, and the results are shown graphically. Such material has been used on posters, for press and special articles, and to illustrate annual reports and publications of local agencies.

Extensive use is made of photographs, and the photographer attached to the Visual Education Unit takes pictures showing various activities of the Community Health Program. For example, a series of pictures has been taken illustrating the preparation of the baby's formula, the Medical Well Child Conferences, the Tuberculosis and Syphilis Control Programs, the Negro Health Guild, and Ragweed Eradication Campaign. Many of these pictures have been used in exhibits, and to illustrate press articles, and annual reports. It has been found that the press is glad to have pictures accompany news releases. Since March, 1938, a total of 224 pictures have been taken and 207 delineascope slides have been made.

The motion picture operator service is very much appreciated in the community. One operator is attached to the WPA project and two local agencies have operators whose services are available. Films have been shown at formal and informal meetings, before discussion groups, at industrial meetings, in clinic waiting rooms, in pool halls, and many other places. For the year ending June 30, 1940, there were 249 film showings of 38 films. This figure only

includes Hartford film showings arranged for through the central bureau.

The writer attached to the WPA project assists with local publicity. He writes radio dialogues, feature articles, does library research work, and interviews health authorities. He aids the press in giving publicity to the various activities of the Community Health Program and plans publicity for such special events as open forums, public health meetings, the Ragweed Elimination Campaign, the Clean-Up Campaign, Negro Health Guild activities, and others.

Special equipment with which to display visual education material is necessary. In addition to equipment which has been puchased by agencies, the following items have been made and are in use in the community.

VISUAL EDUCATION DISPLAY AIDS

Item	*Number*	*Cost Each*
Pamphlet Racks	15	$5.00
Easels	60	.55
Bulletin Boards	20	1.50
Poster Blocks	60	.20
Poster Feet	40	.40

The mechanical media and equipment for health education in Hartford are being widely distributed. They have been used in schools, district adult education classes, leaders' institutes, Health Division meetings, Visiting Nurse Association classes, National Youth Administration classes, nurses' training school classes, dietetic association classes, citizenship classes, Parent-Teacher Association groups, settlement houses, hospitals, libraries, theaters, clinic waiting rooms and industrial plants. Certain exhibits have been shown at the New England Health Institute, Boston, April, 1939; the Connecticut Public Health Association Meeting, Hartford, December, 1939; the New England Labor Meeting, Hartford, May, 1940; the New England Boy Scout Meeting, Swampscott, Mass., May, 1940, and the American Negro Fair, Chicago, July, 1940.

The meetings arranged for during the year ending June 30, 1940, are listed in Table 1. These data do not include groups and materials arranged for independently of the central bureau.

Data concerning mechanical media listed by subject and used in Hartford during the year ending June 30, 1940, and arranged for through the central bureau of the Community Health Education Program are given in Table 2.

TABLE 1

Meetings Arranged Through Central Bureau
July 1, 1939, to June 30, 1940

Group	*Number*	*Attendance*	*Speakers*	*Subjects*	*Film Showings*	*Exhibits*	*Charts*	*Slides*
District I	11	888	10	10	5	2	..	..
District II	27	2,535	26	26	25	10	3	105
District III	138	3,151	138	130	39	7	3	..
Board of Education								
Adults	12	863	11	8	15	8	2	34
Students	33	8,608	13	12	41	6	2	90
Teachers	5	273	5	5	5	2	..	..
Board of Health Personnel	3	56	1	1	2	1	..	45
Clinic Waiting Rooms	14	166	..	8	23	..	..	..
Church Groups	6	395	7	6	9	..	..	55
Industrial Groups	14	336	3	5	17	1	..	..
National Youth Groups	7	1,796	3	5	11	5	..	..
Parent-Teacher Groups	3	270	3	3	11	..	..	..
Professional Groups	25	840	44	22	11	2	10	105
Y.M.C.A.	1	11	1	1	6	..	..	..
Y.W.C.A.	8	216	5	6	13	2	3	..
Camps	18	2,781	19	19	..	..	12	..
Other Adult Groups	18	1,833	17	13	16	7	3	..
Totals	345	25,018	306	280	249	53	38	434

TABLE 2

Mechanical Media Distributed Through Central Bureau
July 1, 1939, to June 30, 1940

Subject	Press		Pamphlets	Broadcasts	Number of Showings			
	Articles	Column Inches	Distributed		Films	Charts	Exhibits	Slides
Administration	68	449	4,839	2	5	5	..	432
Cancer	15	72	3,034	..	..	1	..	..
Diphtheria	..	..	4,930	..	8	301	..	..
Pneumonia	14	70	1,002	1	23	..	..	..
Tuberculosis	80	597	48,013	6	74	201	15	70
Venereal Diseases	35	198	8,425	6	26	22	27	30
Other Communicable Diseases	49	203	3,239	4	19	28	..	30
Food Sanitation	10	43	1,065	3	2	..	..	..
Milk Sanitation	7	91	1,600	2	2	200	..	..
Other Sanitation	21	191	24,220	6	7	260	5	30
Mental Hygiene	19	243	677	1	..	..	..	..
Nutrition	19	204	29,949	1	48	24	97	29
Housing	28	251	1,275	2	1	..	7	12
Laboratory	8	85	600	1	10	..	4	25
Maternal and Child Hygiene	34	261	9,764	11	6	493	18	24
Dental Hygiene	12	100	1,018	2	8	8	4	..
Public Health Instruction	79	725	9,356	7	6	22	..	133
Vital Statistics	1,099	4,273	4,150	1	..	..	..	..
Adult Hygiene	7	29	1,631	6	4	100	..	..
Miscellaneous	45	508	1,200	..	..	..	..	..
Totals	1,649	8,593	159,987	62	249	1,665	177	815

DISCUSSION

The value of such mechanical media as the motion picture, the radio, the exhibit, and printed matter in the field of health education is well recognized. The mechanical media supplement the personal medium with the spoken word in teaching, lecturing, and consultation. They are less expensive than the personal medium, and they are well suited to arouse the interest of masses of the population, and to prepare and make them more receptive to the personal medium.

The possibilities for the use of the mechanical media in interpreting the factors concerned with health and welfare, so that persons will be motivated to healthier and happier living, have scarcely been touched. There is a wide and varied range of subject material which includes the entire field of medicine and the related sciences. The preparation of such media requires a source of authentic information and a staff with imagination, and artistic and technical ability.

At the time the Hartford Plan for Community Health Education was outlined, a survey of visual educational material revealed a lack of suitable material for teaching purposes in local communities. Such material as was available naturally dealt with those factors concerned with health and welfare which pertained to the country as a whole or to large population groups. It was early recognized by persons directing the Hartford Community Health Education Program that visual educational materials were more effective for use in the local community if they dealt with specific problems as they existed locally.

At the Health Education Committee meeting which was held during June, 1938, plans for an audio-visual unit in Hartford were discussed. As mentioned above, local agencies purchased equipment, and mechanical media, and the Board of Health sponsored a WPA Visual Education project. The agencies and their members were enthusiastic about the work, and health education leaders in the community presented subjects to be visualized to the supervisor

of the Audio-Visual Education Unit. At first the mechanical media provided through the central bureau were used largely for those activities planned by the Health Education Program. Requests now come from the entire metropolitan area and certain of the material has had state and national distribution.

The experience in Hartford has demonstrated the need for a planned audio-visual unit. It is not possible for individual agencies to buy all the equipment they need, or to have on their staff skilled artists, photographers, and other technical workers to execute mechanical media of high quality. By pooling the resources of the community and providing a central clearinghouse, it is possible for a city the size of Hartford to provide such material for all agencies. The audio-visual unit should be developed as a part of the Community Health Education Program.

SUMMARY

The experience in Hartford has demonstrated that (1) there is a lack of graded visual health education material for use in local communities; (2) that audio-visual teaching materials developed locally and pertaining to the local situation are usually more valuable than material produced for nation-wide distribution; (3) that a population unit of 100,000 or more should plan for an audio-visual unit; and (4) that the audio-visual unit should be recognized as an essential part of the Community Health Education Program.

REFERENCE

1. Morgan, Lucy S., and Horning, Benjamin G. The Community Health Education Program. *A.J.P.H.*, 30, 11:1323 (Nov.), 1940.

Public Health Applications of High-Speed Photography*

CLAIR E. TURNER, DR.P.H., SC.D., F.A.P.H.A., MARSHALL W. JENNISON, PH.D., AND HAROLD E. EDGERTON, SC.D.

Professor of Biology and Public Health; Assistant Professor of Bacteriology and Sanitary Biology; and Associate Professor of Electrical Measurements, Massachusetts Institute of Technology, Cambridge, Mass.

HIGH-SPEED properly describes single exposure photographs that are taken with exposures shorter than about 1/10,000 second, and motion pictures taken at speeds above 300 pictures per second. The unaided camera, with mechanical shutter, cannot take such pictures, because of both photographic and mechanical limitations.

The development by Edgerton, *et al.*[1-4] of electrical apparatus for producing intermittently flashing (stroboscopic) illumination and for high-speed photography has provided a superior technic for investigating and recording rapid motion. The technic also offers advantages in "still" photography—in "stopping" motion — as a result of the short duration, high intensity illumination.

In addition to its ability to record and to "stop" rapid motion, high-speed photography is useful for measurement and analysis. Since in multiflash and in motion pictures the interval between flashes may be predetermined, the observer is able to record an action as a function of time. Likewise the velocity, shape, and acceleration of the object photographed may be determined from the pictures.

This system of photography has already given results, unobtainable by any other method, on many types of motion problems, technical and nontechnical. Among the subjects studied, which involve rapid motion, may be mentioned the cracking of glass, the quenching of steel, the atomization of liquid fuels, droplet formation by liquids, and studies of machinery, firearms, and propellers. High-speed studies of such physical activities as driving a golf ball, hitting a tennis ball or baseball, and kicking a football have produced useful as well as interesting results (Edgerton and Killian [4]).

In the biological field, high-speed photography has been used to study the rapid movements of the wings of insects and of birds, the reactions of human subjects to unexpected light and sounds, and certain animal movements. Jennison and Bunker [5] utilized high-speed motion pictures for recording and analyzing the movements of cilia. One of the recent public health applications is that of demonstrating the production of droplets in sneezing, and in studying their number, size, and velocity of expulsion (Jennison and Edgerton,[6] Jennison,[7] Jennison and Turner [8]).

* Contribution No. 183 from the Department of Biology and Public Health. Read Before the Public Health Education Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 10, 1940.

With this apparatus, which substitutes an instantaneous, intense flash of light for the relatively slow opening and closing of a camera shutter, exposures may be made as short as 1/1,000,000 second, and motion pictures may be taken at 6,000 or more frames per second. The faster the motion to be photographed, the shorter must be the exposure in order to "stop" it. For example, to "stop" rifle bullets travelling at 2,700 feet per second, 1/1,000,000 second is not too brief an exposure. On the other hand, to record one of the fastest of biological reactions, a sneeze, a relatively long exposure of 1/30,000 second will "stop" droplets having velocities up to 150 feet per second.

It is the light source and its control circuit, not the camera, which is the unique part of this new apparatus. Any standard camera and film may be used, although certain changes must be made in motion picture cameras.

THE EDGERTON APPARATUS

An excellent non-technical discussion, with bibliography, of high-speed photographic methods is given by Edgerton and Killian.[4]

The various forms of the Edgerton lighting equipment will give either a single flash for taking a single "still" picture, or a series of flashes with a predetermined interval of time between them for taking a single multiple exposure photograph or a motion picture.

The heart of this new apparatus—except for special work necessitating a spark source—is the gas-filled light-tube; illumination is produced by the discharge of a condenser (charged to 1,000–3,000 volts) through this tube. Suitable control circuits must be employed with the tube (Figure 1). The light illuminates the object to be photographed with an intense flash of short duration, "stopping" motion by providing an exposure time so short that the fastest object does not move any appreciable distance during the exposure.

The intensity of illumination cannot be measured precisely, but photographically it is equivalent in intensity to the light from some 40,000 ordinary 50-watt electric light bulbs, or on the order of a few million candle power. The intensity of the light is so great that even in daylight, indoors, the apparatus may be used to give a dark-field effect, showing up minute particles which otherwise would not be visible. The high intensity usually makes it unnecessary indoors to consider the amount of other light when making camera adjustments. For most work in biology, exposures of from 1/50,000 to 1/30,000 second are adequate to "stop" motion.

Single pictures may be taken with any ordinary camera, using this light source. The light "substitutes" for the camera shutter in the sense that it gives an extremely short exposure during the relatively long time that the shutter is opening and closing. It is convenient to have an electrical contact on the

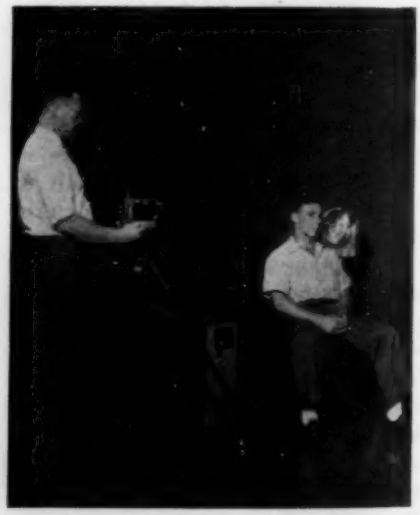

FIGURE 1—Arrangement of subject and apparatus for photographing sneezes. The light-tube is mounted in the parabolic reflector behind the subject.

shutter to set off the flash when the shutter is wide open. The shutter setting is not important.

Multiflash photography, that is, multiple exposures on the same film, is useful for recording certain types of motions, and is much less expensive than motion pictures when it can be substituted for them. Two or more lights are used, which flash in sequence with a short, known interval of time between the flashes. This interval may be varied down to 1/200,000 second or less. More light control equipment is necessary for multiflash work than for single-flash pictures, but the same camera may be used. The duration of each flash is commonly about 1/100,000 second.

High-speed motion pictures require rather complicated light control equipment, and a mechanism for moving the film at high speed. In the camera (without shutter) the film is moved past the lens at a constant and rapid rate. Each time the film has moved the distance occupied by one picture, the subject is illuminated by a flash of light. The time at which the flash occurs is controlled by a commutator attached to the film-driving mechanism. The duration of each flash is about 1/100,000 second, which effectively prevents blurring of individual pictures.

AVAILABILITY OF EQUIPMENT

A commercial form of the Edgerton single-flash lamp and control equipment is made by the Eastman Kodak Company under the name of Kodatron Speed Lamp. With this portable light source, single "stop-motion" pictures may be taken using any standard camera. The Speed Lamp operates on 110 volts a. c. This lamp gives an exposure of about 1/5,000 of a second, and while designed primarily for portrait work, it will "stop" motions having speeds up to about 15 feet per second.

High-speed motion picture camera equipment and multiflash apparatus is available from the General Radio Company, Cambridge, Mass., on special order.

PUBLIC HEALTH APPLICATIONS

Relatively few public health applications of this method of high-speed photography have been made, because as yet the equipment has been available only in a few laboratories. The new portable equipment will greatly extend the usefulness of the technic. There are several unique advantages in stroboscopic-light photography. It will stop the fastest motion. The intensity of illumination is so great that the amount of light already present indoors may be disregarded. The period of exposure is so brief that subjects in hospitals, laboratories, or industry need not pose. Moreover, the light is not painful to the eyes.

Studies of Motion — Photographing the Sneeze—As illustrative of many of the types of records and measurements which can be obtained with complete high-speed photographic equipment, some of our studies on sneezing, still in progress, will be discussed.[6, 7, 8] Most of the results could not have been obtained without stroboscopic-light photography. The pictures have value in health education, as well as in studying communicable disease control.

Single flash pictures will show the expulsion of droplets at any stage of the expiratory phase of the sneeze. Most droplets are "stopped" with an exposure of 1/30,000 second. By placing the light source at the side of the subject's face away from the camera (Figure 1), the droplets are illuminated with a dark-field effect. Photographic images of the particles may be larger than actual droplet size, particularly if the droplets are not in sharp focus. In violent, unstifled sneezes, droplet numbers are in the thousands and tens of

FIGURE 2—A typical violent sneeze. The close approximation of the teeth results in effective "atomization" of the saliva. Many droplet images are larger than actual droplet size. Exposure 1/30,000 second.

FIGURE 3—Sneeze from subject with a bad cold. Note masses of viscid mucus, which is less effectively "atomized" than saliva. The eyes are characteristically closed. Exposure 1/30,000 second.

thousands (Figures 2 and 3). Measurements of droplet size indicate that the majority are usually less than 2 mm. in diameter, and many are less than 0.1 mm.

From the single flash photographs we also note that the involuntary closing of the mouth near the end of a sneeze increases the efficiency of "atomization," producing more and smaller droplets. The droplets come largely from the saliva in the front of the mouth. Also, the number of droplets issuing from the nose is insignificant compared with the number expelled from the mouth. These observations may be important in relation to infectivity, because of differences in the microbic flora of the two regions. As a physiological phenomenon, it is of interest that the eyes are closed, in a natural sneeze, during the expulsion of droplets. This closing is part of the respiratory reflex, and is not caused by the light used in taking the pictures.

Single flash photographs have also shown that the handkerchief or hand held over the mouth is highly effective in preventing expulsion of potentially infective droplets in the air (Figure 4). Some face masks are effective for this purpose, other are less so. Droplets of saliva given off in talking, and particularly in pronouncing consonants, have been photographed, as well as cough droplets.[8]

For obtaining droplet velocities, both multiflash photographs and high-speed motion pictures were employed. With both of these methods, the time interval between successive exposures is known, and measurements of droplet displacements will give the velocity. "Muzzle velocities" up to 152 feet per second in violent sneezes have been recorded, although velocities considerably less than this are more common. The majority of droplets are not expelled farther than 2 or 3 feet, although large masses may travel 12 feet or more.

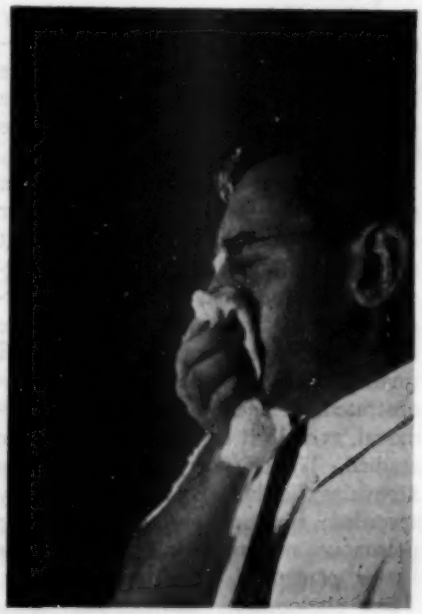

FIGURE 4—A handkerchief or the hand held over the mouth in sneezing or coughing is an effective means of preventing the expulsion of potentially infective droplets into the air. Exposure 1/30,000 second.

Large droplets fall to the ground; smaller ones evaporate. Evaporation of moisture leaves the bacteria in the droplets suspended in the air; these airborne "droplet nuclei" are important in the dissemination of disease, according to W. F. Wells.[9]

High-speed motion pictures, at 1,300 frames per second, also gave a method for investigating the movements of the head in sneezing. A typical sneeze consists of a short inspiration, followed by a forcible expiration. At the inspiration the head is thrown back; a rapid down-stroke of the head, and expulsion of droplets then takes place. From the beginning of the down-stroke of the head, to the expulsion of droplets and the end of this movement, the time may be as little as 0.07 second.[7]

These sneeze studies demonstrate several applications of stroboscopic pho-

tography. Velocity measurments, body movements, and particle size are obtainable. In particular, the intense light will show up minute particles which otherwise would not be visible under ordinary conditions.

As regards the study of particles in motion in the air, a number of other applications of public health interest are indicated for high-speed photography. In the field of industrial hygiene, dusts, fumes, and smokes are important. Their presence, even if of small particle size, can readily be demonstrated. Their production and removal, even if at high velocities, can be studied. The efficiency of equipment in atomizing liquids may be permanently recorded; spraying processes, involving poisonous materials, can perhaps be better controlled after proper study. These photographic methods may often be used to demonstrate graphically, as evidence or for health education, the presence of particles, the existence of which had not been realized.

Color Photography — With suitable filters, stroboscopic-light photographs may be taken in color as illustrated by photographs of brilliantly colored humming birds in motion. Besides offering a standard illumination for color photography, stroboscopic light can be used more readily than other lights from the point of view of the subject being photographed. Photographs of skin lesions, records of fungal infections, operations, etc., are more easily obtained, since the subject need not pose, and is hardly aware of the light. The successful but trying experiences of one of the writers in using continuous, artificial illumination in the color photography of skin lesions in some of the common communicable diseases have emphasized the advantages of stroboscopic light.

Photomicrography—The possibilities here have been little investigated, but certain definite advantages obtain with intermittent light, whether for "still" pictures or for motion pictures. The control instruments can be used to produce illumination from a spark source rather than from the light-tube. A spark approximates a point-source of light, and is therefore particularly useful for photomicrography. Furthermore, the intermittent light is advantageous in that it will not injure living microörganisms as readily as continuous light. Such records will, therefore, be more "normal."

General Photography — For general use, particularly in photographing human subjects, stroboscopic light is superior. Posing is unnecessary, time is saved, and the duration of the flash is so short that it has no bad effects on the eyes. Such advantages are most important in photographing sick patients and children. It would appear particularly advantageous for the public health worker in making indoor action pictures of any kind. Under certain conditions this method of photography can also be used outdoors.

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Value of Bacteriophage Determinations as a Supplemental Procedure in the Diagnosis of Bacillary Dysentery*

K. M. WHEELER, PH.D., AND A. L. BURGDORF, M.D.

Bureau of Laboratories and Bureau of Preventable Diseases, State Department of Health, Hartford, Conn.

THE laboratory diagnosis of dysentery has depended principally on detection of causative organisms in stools from cases of the disease.[1] Results of this procedure have not been wholly satisfactory since the organisms are usually difficult to detect except during the first few days after onset. A supplemental procedure which sometimes is of use, although difficult of interpretation, is the agglutination test of patient's serum against known strains of dysentery organisms. The apparent value of another supplementary method for determining etiology in cases of diarrhea, examination for bacteriophage, was pointed out by Feemster.[2, 3] His report of an outbreak of *Shigella paradysenteriae* (Hiss-Y-type) infection showed that phage acting on that strain of paradysentery could be detected in a high percentage of cases (80 per cent during the second and 45 per cent during the third week after onset).

During a recent institutional outbreak of dysentery caused by a Strong variety of *Shigella paradysenteriae* we have had occasion to examine stool specimens for bacteriophage. Since from most cases fecal specimens were not available for bacteriological examination at the state laboratory until some time after onset, it seemed that examination for bacteriophage might be useful in identifying the cases.

METHODS

For bacteriophage determinations the fecal specimens were taken in sterile containers without preservative and examination was begun 2–6 hours after collection. Upon arrival at the laboratory approximately 10 gm. of specimen were transferred to a 100 cc. centrifuge tube; about 50 cc. of sterile broth were added, mixed with the specimen, and allowed to stand for 1 to 2 hours at room temperature. After centrifugation at high speed the clear supernatant was filtered through Berkefeld N candles. One cc. of filtrate was added to 0.5 cc. of 18–24 hour broth culture of *Shigella paradysenteriae* and incubated at 37° C. In all instances a strain of paradysentery isolated from the outbreak was used; sometimes several strains as well as stock paradysentery strains were included as test organisms. After incubation for 1, 2, and 4 days, a large loopful of the filtrate-culture mixture was transferred to a tube containing 2 cc. of a young broth culture of the organism. A

* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

large loopful from this tube was then spread over a sector of an agar plate. After overnight incubation the plate was examined by oblique transmitted light against a black background. Bacteriophage was indicated by areas in the seeded sector which showed no growth. The areas varied from minute scarcely visible plaques, few in number on some specimens, to almost complete lysis and absence of growth over the entire sector. Platings were made in this manner even though the original filtrate-broth mixture showed clearing of turbidity.

Stool cultures for dysentery organisms were made according to the routine methods [4] on both eosine-methylene-blue and desoxycholate citrate agars. The isolated pure cultures were identified biochemically and serologically. Agglutination tests with patient's serum were performed in the usual manner against stock *Shigella* cultures and also against strains isolated during the outbreak. Titers of 1:320 or higher have been called positive.

RESULTS

Ninety-three fecal specimens from 61 individuals were examined for bacteriophage; 20 were clinical cases of dysentery; the remaining 41, many of whom were in contact with the disease, showed no clinical symptoms although stool cultures from some of these repeatedly yielded dysentery organisms.

Clinical cases—Relationship of the time interval between onset of symptoms and laboratory examination, to the results of culture and of phage examinations on 20 clinical cases of dysentery is shown in Table 1. The earliest specimens examined for phage were collected during the 3rd week after onset and from the 3rd through the 9th week phage was isolated in a high proportion of specimens—72.7 per cent. Ten weeks after onset no positive specimens were found. Cultural examination of the same individuals showed a much lower proportion of positive results, averaging 13.8 per cent for this 7 week period. The figures for the latter part of this interval appear high, however, in view of other reports.[1, 2] *Shigella* organisms were isolated from 5 specimens from 3 patients after the 10th week. Phage examinations were not made on all of these cases at the time of the positive cultures but within 2 weeks afterward were found to be negative. One case has been a persistent carrier of the organism with repeated negative phage tests over a 5 month period.

Further information concerning the 20 clinical cases is given in the first part of Table 2 which shows the relationships between clinical symptoms, bacteriophage examinations, stool cultures and agglutination tests. Six cases were positive by both culture and phage tests and 3 of these had significantly strong agglutinins. Nine cases were missed by cultural examination but carried phage when examined before the 10th week after onset. Repeated cul-

TABLE 1

Relationship of Time Interval Since Onset to the Results of Cultural and Bacteriophage Examinations of Fecal Specimens from Clinical Cases of Bacillary Dysentery

Week After Onset	Stool Cultures				Bacteriophage Tests			
	Number Examined	Number Positive	Percentage Positive		Number Examined	Number Positive	Percentage Positive	
1– 2	6	3	50.0		0	0		
3– 5	28	3	10.7	Average 13.8	6	4	66.7	Average 72.7
6– 7	19	3	15.8		6	5	83.8	
8– 9	33	5	14.3		10	7	70.0	
10–15	85	5	5.9		14	0	0.0	

TABLE 2

Relationships Between Clinical Symptoms and Results of Laboratory Diagnostic Tests for Bacillary Dysentery

Clinical Symptoms	*Bacteriophage Determination*	*Cultural Examination*	*Agglutination Test*	*Number of Individuals*	
+	+	+	+	3	6
			—	2	
			X*	1	
		—	+	6	9
			—	3	
			X	0	
	—	+	+	1	3
			—	2	
			X	0	
		—	+	1	2
			—	1	
			X	0	
—	+	+	+	—	9
			—	7	
			X	2	
		—	+	1	2
			—	1	
			X	0	
	—	+	+	—	8
			—	3	
			X	5	
		—	+	—	22
			—	—	
			X	22	

* X Agglutination tests were not done.

tural examinations were made in these, as in the other cases, although with one exception the earliest specimens were not collected before the 3rd week. The 3 individuals in the next group are of special interest since they gave positive stool cultures while specimens examined for phage at the same time and later were negative. Paradysentery organisms were first isolated during the 4th week after onset, and were found at intervals over a considerable period—during 14 weeks from one patient. To eliminate the possibility that variation in either phage or culture might account for the failure to demonstrate phage in these cases, fecal filtrates from 2 of them were tested against several isolations of *Shigella paradysenteriae* obtained from the same cases. All tests were negative. The 2 remaining clinical cases shown in Table 2 were negative by culture and phage tests, although 1 had significantly high titering agglutinating antibodies.

Non-clinical cases—Specimens were tested for phage from 41 individuals without clinical symptoms; 17 had positive stool cultures. Two groups of apparently uninfected individuals were selected as a control to evaluate the significance of the phage determinations. One group of 13 was from the same building in which the outbreak occurred and each had had at least 5 negative stool cultures at the time of examination; 12 other patients were selected from a different building. These groups provided a control having age distribution and environmental factors similar to the infected group. Bacteriophage for *Shigella paradysenteriae* was isolated from 2 in the first group, and

subsequently a positive stool culture was obtained from 1 of these. One person in the second group yielded phage, and moderately strong agglutinins were detected in her blood serum. The remaining 22 gave negative tests.

Results of the various laboratory tests on the 41 individuals who had shown no clinical symptoms of dysentery are given in the second part of Table 2. Eleven exhibited phage, and from 9 of these the organism was isolated. On the other hand, positive cultures were obtained from 8 whose phage tests were negative. As a further check on these individuals the filtrates were tested against the autologous dysentery strains, but in no case was phage demonstrated. The final row in Table 2 shows 22 of the control individuals who were negative by all laboratory tests.

CHARACTERISTICS OF THE BACTERIOPHAGE STRAINS ISOLATED

Specificity tests were made on 4 phage strains. Three were from different clinical cases of which only 1 yielded positive cultures for dysentery organisms. The 4th strain was from a subclinical infection since the organisms were isolated, and yet no clinical symptoms were observed. Specificity tests were made on broth filtrates after 10 serial transfers on a dysentery strain isolated from the outbreak. Dilution of the original filtrate at the time of test was approximately 1×10^{25}. The technic was similar to that employed in testing stool filtrates for phage, and in all instances readings were made by examining plates inoculated with phage-filtrate mixtures.

The phage strains were specific for certain *Shigella* organisms since no lytic action could be detected when tested against 10 *Escherichia*, 10 *Aerobacter*, 4 *Proteus*, 6 *Salmonella* and *Eberthella*, 1 Serratia, and 2 Pseudomonas strains. Among strains in the *Shigella* genus no lysis occurred with stock *Shigella dysenteriae* Shiga (2 strains), *Shigella ambigua* Newcastle (5), *Shigella madampensis (dispar)*, *Shigella alkalescens* (3), *Shigella sonnei* (3). When tested against stock strains of *Shigella paradysenteriae*, lysis occurred with Flexner V, W, X, and Y, Hiss, Strong, and Army types, but action on two strains labeled Harris and Flexner H. could not be detected.

The 4 phage strains were also tested against 70 strains of *Shigella paradysenteriae* isolated from the outbreak, and all except 3 were susceptible to phage action. The 3 resistant strains were isolated at the hospital early in the outbreak from clinical cases, of which 2 died and the 3rd was severely ill. When examined at the state laboratory these 3 strains gave biochemical reactions identical with the phage-susceptible strains. Serological reactions, however, differed from others tested at that time in being weaker with Hiss and Strong antisera and stronger with antiserum prepared with the Harris strain (which was phage resistant). Unfortunately, phage determinations could not be done on specimens from the 3 individuals.

In no case did the 4 strains of bacteriophage differ qualitatively in their virulences when tested in the above series against 125 cultures of Gram-negative rods in the family Enterobacteriaceae.

A further check on the identity of the phage strains was made by (1) comparison of morphological characteristics of the plaques, and (2) comparative cross-resistance tests on variants of a single susceptible strain.

When plated with the same strain of susceptible paradysenteriae all phage isolations appeared to have essentially the same plaque form, and no differentiation could be made on the basis of size or of marginal characteristics.

Comparative cross-resistance tests were made with 10 strains of phage using resistant variants produced by

growth of the phage in a broth culture of *Shigella paradysenteriae* strain 18,601 isolated during the outbreak. After a 5 day incubation period, mixtures of culture and phage were plated, and colonies picked to broth. They were then tested by the method of Ashehov,[5] which consists of inoculation of a sector of an agar plate with the test organism followed by addition of a small drop of the phage filtrate. After incubation a susceptible strain will show no growth in the area to which phage has been added. By this method resistant variants to 10 strains of phage were tested against each of the 10 strains. The phage strains were isolated from clinical cases, from subclinical cases, and from culturally negative individuals. In all cases the phage strains were purified by at least 3 successive platings and pickings from isolated plaques. Some of the strains were also carried for 10 or more successive transfers on a strain of *Shigella paradysenteriae* before plating. Results of the cross-resistance tests showed that 9 of the 10 strains appeared to be identical in that a variant of *Shigella* culture 18,601 which was resistant to one strain of phage was resistant also to the other 8 strains. In all cases smooth variants were used for these tests. An occasional rough resistant variant was produced, but when tested, these also failed to show differences between the 9 strains of phage. Strain 39 was unlike the others in that it lysed all but one (69) of the other strains. It is interesting that strain 39 was isolated from an individual in one of the control groups, previously mentioned, who was apparently well but from whom a strain of *Shigella paradysenteriae* was isolated subsequent to the positive phage test. Her phage tests were positive over a 9 week period, concurrently, during the latter part, with positive stool cultures. When tests were carried out with resistant variants produced from other *Shigella* strains, similar results were obtained, although minor differences in virulence of the phage strains appeared. These seemed to be quantitative rather than qualitative. With the exception of isolations from one individual, phage strains obtained during the outbreak appeared to belong to a homogenous group.

DISCUSSION

From the extensive literature on the widespread occurrence of bacteriophage in fecal material its isolation would seem to have little diagnostic significance. That this is not true for the present series of tests is amply shown by the control examinations. Of the 25 people selected for the control, comprising an age and environmental group similar to the group of clinical cases, 3 phage isolations were made, of which only 1 lacked other confirmatory laboratory evidence of infection. Furthermore, 8 months after the beginning of the outbreak 62 individuals in one ward of the same building where the outbreak occurred were examined for phage. Many of these people were recovered cases or had been subclinical infections whose stool cultures had been negative for several months. Phage acting on the test strain 18,601 was isolated from 3 people. However, these bacteriophage strains were considerably different in plaque form, in specificity, and in cross-resistance tests from the previous strains. Repeated examinations of the 3 people failed to show *Shigella paradysenteriae*. Possibly the low incidence of phage in the control groups is due in part to the use of an indicator strain of *Shigella paradysenteriae* isolated from the outbreak which would tend toward limiting the detection of phage to specific races. On some specimens, however, several organisms were used, including stock *Shigella* cultures with no difference in results.

In certain types of dysentery outbreaks, particularly institutional epi-

demics, examination of stool specimens for bacteriophage appears to be of value as a supplementary procedure for laboratory diagnosis. This is especially true when examinations cannot be made until some time after onset of symptoms, even though with the newer differential plating media cultural examinations are increasingly more satisfactory. Among the 20 clinical cases of dysentery which we have examined, phage was isolated from 9 (45 per cent of the total) bacteriologically negative individuals. However, apparently not all cases develop a phage since we encountered one person, a very mild case of dysentery, on whom repeated phage examinations were negative even though she has continued to yield the organism intermittently for at least 5 months after the beginning of the outbreak. Another of this type was found among the subclinical infections. Others from whom cultures were intermittently positive over relatively long periods of time cleared up without demonstrable phage although it is possible that phage was present and disappeared quickly since determinations were not made until 2 or 3 weeks following the last cultural isolation.

Several individuals gave concurrently positive culture and phage tests for varying periods of time up to 2 weeks. Organisms isolated from these individuals were susceptible to the phage strain, but apparently the *in vivo* activity was not sufficiently strong to eliminate the organisms. The fact that a low proportion of specimens were positive culturally for a considerable time and that sometimes consecutive positive specimens were 5 or 6 weeks apart, with as many as 12 negative examinations in the interval, suggests that the phage might have been exerting some *in vivo* action.

Phage determinations should be made only as a supplementary procedure since, as we have shown, phage cannot always be detected in individuals known to be infected. However, the value of the examination is amply shown by the relatively large number of known clinical cases, from whom dysentery organisms were never isolated but who carried phage, acting on the specific strain involved in the outbreak. At least a brief study of the characteristics of the phage strains isolated in an epidemic, particularly to show homogeneity, aids in interpreting the significance of the phage. The value of agglutination tests with patient's serum appears to lie chiefly in confirming other diagnostic means.

SUMMARY AND CONCLUSIONS

Cultural and bacteriophage examinations of specimens from 61 individuals, including 20 clinical cases of bacillary dysentery, have shown that:

1. Bacteriophage for a strain of *Shigella paradysenteriae* involved in the outbreak could be isolated during the 3rd to 9th week after onset from a high proportion of specimens from clinical cases, 73 per cent, compared with 13 per cent from which the organism could be recovered.

2. Bacteriophage but not *Shigella* organisms were isolated from 45 per cent of the clinical cases during the 3rd to 9th week after onset. Only 15 per cent yielded positive cultures with negative phage tests.

3. Some individuals with clinical and some with inapparent infections failed to show phage; positive cultural examinations on these individuals subsequently became negative without laboratory evidence of the action of the phage.

4. Phage isolated from infected individuals, for the most part formed a homogenous group with respect to plaque form, specificity and cross-resistance tests. The presence of these strains of phage appeared to be "diagnostic" since they were isolated in only one instance where there was no other laboratory or clinical evidence of infection.

5. Neither cultural nor bacteriophage tests separately provided as much information for diagnosis as the two combined. Bacteriophage determinations are valuable as a supplementary test to cultural examination in the study of outbreaks of dysentery, especially when examinations are made some time after onset of disease.

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National Health Library

THE National Health Library, administered by the National Health Council, is now settled in new quarters at 1790 Broadway, New York, N. Y., and is prepared as formerly to furnish loan and bibliographical service to members of the American Public Health Association and other National Health Council Agencies. According to Isabel Towner, the Librarian, this collection is the most complete on public health in this country and is especially noteworthy for its index catalog on cards. In this are listed under author and subject not only the 6,000 books and 30,000 pamphlets now making up the collection, but also articles on public health and allied subjects in current magazines. Public health workers interested in specific subjects find here up-to-date material under subject and author. The Library receives about 500 magazines. State and city health department bulletins are also indexed. These are not included in any other index. The files of these bulletins, some dating from 1920, form an especially valuable source of material. The Library is preparing a special card index on the health aspects of national defense, preparedness, and war.

Every Friday the Library issues a mimeographed list of selected articles, a weekly index to current periodical literature in the field of public health. There is a small annual subscription for this Library Index. The articles included are classified under such general heads as communicable disease, health education, industrial hygiene, national defense, public health nursing, social hygiene, tuberculosis, etc.

Have you seen the Nomination Blank on page XXXIX?

Rôle of Rats in the Spread of Food Poisoning Bacteria of the Salmonella Group*

HENRY WELCH, PH.D., M. OSTROLENK, AND M. T. BARTRAM, PH.D

Senior, Assistant, and Associate Bacteriologists, Division of Bacteriology, U. S. Food and Drug Administration, Washington, D. C.

THE fate of *Salmonella enteritidis* when fed to rats under laboratory conditions was demonstrated in a previous publication.[1] Transmission of infection with *Salmonella enteritidis* from an infected rat to cage mates and the existence of the carrier state in a small number of infected rats as long as the 40th day after infection was also shown. The absence of *Salmonella* infection and agglutinins for organisms of the *Salmonella* group in 800 normal laboratory animals was reported. In the present investigation these studies have been extended to include the longevity of *Salmonella enteritidis* in rat pellets, the minimum dose of this organism necessary to provoke infection in rats and mice and the distribution of *Salmonella* in rats and mice pellets collected throughout the United States.

Attempts to isolate organisms of the *Salmonella* group from rat or mouse excreta have usually been made because of food poisoning outbreaks. As far as can be determined from the literature no attempt has been made previously to study rodent pellets collected over a large area without regard to history of intestinal disease. Savage and White[2] isolated *Salmonella enteritidis* from the intestines of rats but failed to demonstrate these organisms in their excreta while Salthe and Krumweide[3] were successful in isolating *Bacillus pestiscaviae* from rodent excreta obtained in a bakery where prepared cream filling was shown to be the cause of a food poisoning outbreak. Our preliminary[1] studies appeared to indicate that infected rats excrete the infecting organism intermittently. Because of this, it would seem that a study of the incidence of *Salmonella* in rat or mouse excreta would be of more significance from the standpoint of food poisoning potentialities than a similar study of the organs of the rodents. Isolation of *Salmonella* from the organs of rats has been demonstrated by Meyer and Matsumura,[4] Verder,[5] Kerrin,[6] Khabil,[7] and Hatta,[8] in from 0.7 per cent to approximately 13 per cent of the animals examined. In each instance these investigators studied rats obtained from a relatively small locality and, in view of the apparent ease with which infection is transmitted within colonies of these animals, a false impression of the incidence of infection in rodents as a whole might be obtained by a study of the

* Read at a Joint Session of the Laboratory, Food, and Nutrition, and Epidemiology Sections of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

figures presented. Furthermore, the significance of rats as vectors of food poisoning organisms similarly might be overemphasized, particularly in view of the known intermittency of excretion of the *Salmonella* organisms by infected animals. Meyer and Matsumura (*loc. cit.*) recognized the possibility of misinterpreting the incidence of *Salmonella* in rats when they point out that although Savage and Reed found an incidence of 8.5 per cent their studies were confined to a slaughterhouse. Meyer and Matsumura, on the other hand, made their studies in large districts of a growing city. In studies on the relation of virulence of *Bacterium aertrycke* and epidemic potency Topley, *et al.*[9] have demonstrated an apparent relationship between virulence and power of infection to spread within colonies of mice. Webster[10] and his coworkers, however, in a long series of carefully controlled studies describe the virulence of any single strain of *Salmonella aertrycke* as but slightly variable, considering that any single strain maintains a constant level of virulence for an indefinite period of time under the usual methods of cultivation. Topley[11] later showed that when susceptible mice are added continuously and at a constant rate to an infected population, the spread of infection, as judged by a mortality curve, is propagated in regularly recurring waves. There is little doubt that, in laboratory studies on the infectivity of *Salmonella* for rats or mice, consideration must be given to the strain used. It will be shown later that the strain of *Salmonella enteritidis* used in this study was highly infective for both rats and mice. In contrast to these results, Kligler and Olitzki[12] report that rats are highly resistant to infection with *Salmonella enteritidis* and because of this massive doses and infant rats had to be used in their studies.

EXPERIMENTAL

To determine the longevity of *Salmonella enteritidis* in rat excreta a single animal was fed 0.5 cc. of a broth culture by stomach tube and placed with 4 normal rats for a period of 10 days. On the 10th day all feces were collected and stored in Petri dishes at room temperature. At intervals specimens of these stored feces were examined for *Salmonella enteritidis* by emulsifying 2 gm. in 10 cc. of tetrathionate broth from which decimal dilutions were made in the same medium. The broth tubes were incubated at 37° C. for 24 hours, after which bismuth sulfite agar plates were heavily streaked from the broth tubes and incubated at 37° C.

TABLE 1

Longevity of Salmonella enteritidis in Rat Feces Stored at Room Temperature

Amount of Feces Examined (Grams)	Days Feces Examined											
	1	10	14	21	29	50	74	92	121	143	182	189
2.0	+	+	+	+	+	+	+	+	+	+	0	0
0.2	+	+	+	+	0	+	+	+	+	+	0	0
0.02	+	+	0	0	0	0	0	+	+	0	0	0
0.002	0	0	0	0	0	0	0	0	0	0	0	0

NOTE—One rat fed 0.5 cc. 24 hr. broth culture. Fed rat caged with 4 normal rats for 10 days. On 10th day all feces collected and stored at room temperature.

METHOD OF EXAMINATION—Two grams feces emulsified in 10 cc. tetrathionate broth and decimal dilutions made in tetrathionate broth. Tubes incubated at 37° C. for 24 hrs. Bismuth sulfate agar plates streaked then incubated at 37° C. for 2 days. Suspicious colonies fished and identified biochemically and serologically.

+ = sal. ent. isolated.
0 = negative.

for 48 hours. Suspicious colonies were isolated and identified biochemically and serologically. The results are given in Table 1.

At no time was *Salmonella enteritidis* isolated from the dilution representing 0.002 gm. of feces while in every instance *Salmonella enteritidis* was isolated from 2 gm. portions of feces up to and including the 148th day. All specimens examined on the 182nd day were negative.

Preliminary studies had shown that extremely small inocula (*per os*) of the strain of *Salmonella enteritidis* used in this investigation were necessary to bring about infection and subsequent excretion of the organism in both rats and mice. To determine the minimum numbers of *Salmonella enteritidis* neces-

TABLE 2

Minimum Numbers of Salmonella enteritidis Necessary to Produce Infection in Rats and Mice by Stomach Tube Feeding

Rats									Mice								
			Excretion of *S. enteritidis* in Feces; on Days After Isolation									Excretion of *S. enteritidis* in Feces; on Days After Isolation						
Average Number Organisms		Animal Number	1	3	7	9	13	15	Number Positive	Average Number Organisms	Animal Number	1	3	7	9	13	15	Number Positive
F	15	1	O	O	O	O	O	O		F	1	O	O	O	O Dead			
e	"	2	+	O	O	O	O	O		e	2	O	O	O	O	O	O	
d	"	3	+	+	O	+	O	O		d	3	O	O	O	+ Dead			
	"	4	+	O	O	+	+	O	3		4	O	O	O	O	O Dead		
											5	O	+	* Dead				4
o										o								
n	6	5	O	O	O	O	O	O		n	6	+	O	O	O	O	O	
e	"	6	O	O	O	+	O	O		e	7	O	O	O	O	+ Dead		
	"	7	O	+	O	+	O	O			8	+	+	+	+	O	O	
c	"	8	+	+	O	+ Dead				h	9	O	O	O	O Dead			
c	"	9	+	O	O	O	O	O	4	a	10	O	O	+	+	+ Dead		5
										l								
										f								
a																		
m	4	10	+	O	O	O	O	O		c	11	O	O	O	O	+	O	
o	"	11	+	O	O	O	O	O		c	12	O Lost						
u	"	12	O	O	O	O	O	O			13	O	O	O Dead				
n	"	13	O	O	O	O	O	O			14	*	* Dead					
t	"	14	O	O	O	O	O	O	2		15	O	O	O	O	+	O Dead	4
s																		
										a								
	2	15	O	+	O	O	O	O		m	16	O	O	O	O Dead			
	"	16	O	O	O	O	O	O		o	17	O	O	+	O	O Dead		
	"	17	O	O	O	O	O	O		u	18	O	O	O Dead				
	"	18	+	+	O	O	O	O		n	19	O	O	+	O	O	O	
	"	19	O	O	O	O	O	O	2	t	20	+	+	+ Dead				3
										s								
	1	20	O	O	O	O	O	O			21	* Dead						
	"	21	O	O	O	O	O	O			22	O	+	O	+ Dead			
	"	22	O	O	+	+	O	O			23	O	O	O	O Dead			
	"	23	+	+	O	O	O	O			24	O	O	O Dead				
	"	24	+	O	O	O	O	O	3		25	O	O	O	O	O	O	4

Average number organisms—based on triplicate plate counts of amounts fed
Dead animals positive for *S. enteritidis* on autopsy
+ = Isolation of *S. enteritidis*
O = Negative
* = No feces available

sary to bring about infection in these animals a 24 hour broth culture was diluted 10–8 and 1 cc. amounts fed by stomach tube to each of four rats. The same amount of this dilution was inoculated into dextrose agar plates in triplicate. The average plate count was 15 organisms per cc. Further dilutions of 1:2, 1:4, 1:8, and 1:16 of the 10–8 dilution were made and each dilution in 1 cc. amounts was fed to each of 5 rats. Triplicate plate counts were made of each dilution. These results are given in Table 2.

Included in Table 2 also are the results obtained on feeding 0.5 cc. amounts of the above dilutions to each of 5 mice. The mice thus received approximately half the number of organisms fed to the rats. Three of the 4 rats fed with 15 organisms (based on plate counts) were infected and one-half this amount fed to mice resulted in infection of 4 out of 5 fed. Similarly, infection was obtained in rats with dilutions of broth culture which were shown by plate counts to contain an average of one organism per cc. In mice the infecting dose averaged less than one organism per cc. Although the plate counts may not reflect the exact numbers of organisms fed these animals, these results would indicate that very few organisms of the strain of *Salmonella enteritidis* used were necessary to bring about infection in both rats and mice by stomach tube feeding.

In studying the natural transfer of *Salmonella enteritidis* in rats, 8 attempts at transfer into colonies of normal rats have been made. Five of the transfers were successful and 3 resulted in failures. For transfer purposes the animals were either infected by stomach tube feeding or by intravenous injection. After inoculation the treated ani-

TABLE 3

Natural Transfer of Salmonella Enteritidis in Rats

	Positive Fecal Specimens on Days After Isolation										*Agglutinin Titers*
	2	*3*	*5*	*6*	*7*	*8*	*9*	*10*	*14*	*21*	*25*	
☒ Fed 100 cells												
☒ □ ☒ Composite fecal specimen		+	+	+								1:320 (30 Day)
☒ □ ☒ →		+			+			+				
☒ □ ☒ →	+			+			+			O		1:640 (14 Day)
☒ □ ☒ →		+		+		+						1:80 (20 Day)
☒ □ ☒ →		+				O						1:80 (10 Day)
☒ □ ☒ →		+		+								1:80 (9 Day)
☒ □ ☒ →		+		+		+						1:160 (8 Day)
□ □ □ →											O	1:40 (28 Day)
□ □ □ →												1:40 (21 Day)

NOTE—One rat fed, by stomach tube then placed in a colony of normal rats for 7 days. One rat was then isolated to determine infection. The other rat was placed in a new colony of normal rats.

□ = Uninfected rat
☒ = Infected rat
\+ = *S. enteritidis* isolated
O = Negative

TABLE 4

Natural Transfer of Salmonella enteritidis in Mice

Animal Number	Examination of Fecal Specimens on Days After Isolation									
	2	3	5	7	9	12	14	16	20	22
1	O	+	+	O	+ Dead					
2	+ Dead									
3	+	O	O	O	O Dead					
4	O	+		O		O	O	O	O	O
5	+		O	O		O	O	O Dead		
6	+		O Dead							
7	O		O	O		O	O	O	+ Dead	
8	O		O	O		O	O	O	O	O
9	O		O	O		O	O	+	O Dead	
10	+		O (Placed in a colony with 10 normal mice for 7 days)							
10		Dead								
31			+		O	O		+ Dead		
32			O		O	O		+	O	
33			+		+	C		+	+ Dead	
34			+		O	O		+ Dead		
35			+		O (Placed in a colony with 4 normal mice for 7 days)					
36			O		O	O Dead				
37			O		O	+ Dead				
38			O		O	O Dead				
39			O		O Dead					
40		Dead								
35	O		O Dead							
41										
42	O		O							
43	+		O (Placed in a colony with normal mice)							
44	+		O " " " " " " " "							

NOTE—Animal number 1 injected intravenously 0.1 cc. 24 hr. broth culture
Infected animal caged with 9 normal mice for 7 days
All animals then isolated to determine infection
Transfer colonies 10 & 35 as above
+ = *S. enteritidis*
O = Negative

mal was isolated until *Salmonella enteritidis* could be demonstrated in the excreta, following which the infected animal was placed with a group of normal animals. The colonies of normal animals varied in number from a minimum of 2 to a maximum of 10. Although one of the 3 failures occurred in a colony containing 10 animals, it is of interest that all 3 failures occurred in those colonies in which the infected animals had been injected intravenously. In each instance where the infected rat was fed by stomach tube, colony transfer of *Salmonella enteritidis* was successful. Intravenous injections consisted of 0.1 cc. of broth culture (approximately 10^7 organisms), while stomach tube feeding was accomplished with approximately 100 bacterial cells in 1 cc. of salt solution. The composite feces from colonies in which transfer of infection from one infected animal to cage mates had been accomplished were examined for *Salmonella enteritidis* at intervals for 1 month before being discarded.

The results of natural transfer of *Salmonella enteritidis* through 7 rat colonies are given in Table 3.

In this experiment one rat was fed 100 bacterial cells by stomach tube, identified with dye, and placed with a colony of 5 normal rats for a period of 7 days. During this interval composite samples of excreta were examined for

Salmonella enteritidis by emulsifying in tetrathionate broth followed by streaking on bismuth sulfite agar. For the sake of simplicity 3 rats only in each colony are shown in the table. At the end of 7 days one of the rats in the first colony was isolated to determine whether passage had been successful, and another was placed with a fresh colony. This procedure was repeated with 9 colonies. It will be seen from the table that natural transfer occurred in 7 colonies. Both the 8th and 9th colonies failed to show *Salmonella enteritidis* in their excreta. In spite of failure to get transfer of infection in colonies 8 and 9, the blood sera of rats isolated from these colonies showed agglutinin titers of 1:40. Since studies of a large number of our normal laboratory rats have failed to reveal agglutinins for the *Salmonella enteritidis* strain used, a titer of 1:40 probably indicates transfer of infection in both colonies 8 and 9.

Similar studies of natural transfer of *Salmonella enteritidis* in mice have been made. The results are given in Table 4 which shows that to date only 3 colony transfers have been completed. This work, however, is being continued.

In contrast to the natural infection in rats which seemed to withstand infection with *Salmonella enteritidis* quite well, many of the mice so far studied have died shortly after becoming infected.

The relative ease with which infection and, in some instances, death, resulted in mice following stomach tube feeding, coupled with the observation that massive doses of organisms were necessary to bring about this result in rats and mice by intravenous injection, made it desirable to determine the minimum lethal dose of organisms for these animals when the latter route of injection was used. Accordingly, 100 rats and 100 mice were divided into groups of 20 each and increasing numbers of *Salmonella enteritidis* were injected intravenously in the median vein of the tail, and the number of animals dying of acute infection determined over a period of 5 days. These results are shown in Table 5.

TABLE 5

Mortality in Rats and Mice Following Intravenous Injection of Massive Doses of Salmonella enteritidis

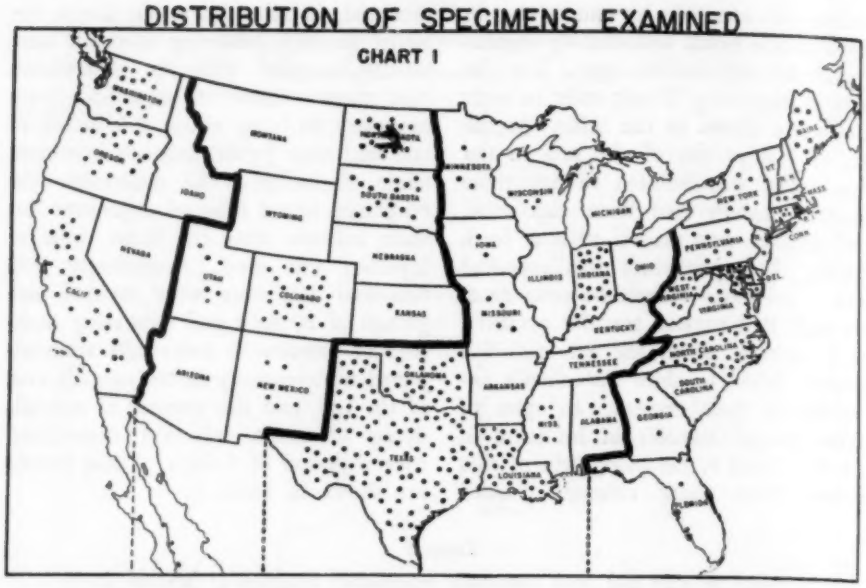
Mice								*Rats*							
		Mortality in Days					*Total*			*Mortality in Days*					*Total*
Number Animals	*Number of Organisms*	*1*	*2*	*3*	*4*	*5*	*Number Dead*	*Number Animals*	*Number of Organisms*	*1*	*2*	*3*	*4*	*5*	*Number Dead*
20	850,000,000	8	7	4	0	1	20	20	4,000,000,000	4	2	3	1	0	10
20	425,000,000	1	5	9	2	2	19	20	3,000,000,000	1	2	4	3	3	13
20	212,000,000	1	3	7	7	0	18	20	2,000,000,000	2	1	4	4	2	13
20	42,500,000	0	0	2	3	0	5	20	1,000,000,000	1	0	1	1	3	6
20	21,000,000	0	0	1	1	2	4	20	200,000,000	0	0	0	0	2	2

It will be noted that more than 212 million organisms were required to cause 90–100 per cent mortality in mice and that only 65 per cent of the rats were killed with 2 billion organisms by this method of injection. Nearly 50 per cent of the mice injected with 21 million organisms lived for 28 days, while those injected with twice this number lived for 11 days. These results are in marked contrast to those obtained by feeding this organism (see Table 2). The results shown in Table 2 indicate that infinitely small numbers of organisms will infect both mice and rats and that fatalities in mice occur in 13 days or less when only approximately 7 organisms are fed by stomach tube.

To determine the incidence of *Salmonella* in rat and mice excreta col-

DISTRIBUTION OF SPECIMENS EXAMINED

CHART 1



lected from widespread areas, samples have been collected throughout the United States through coöperation of the Division of Predator and Rodent Control, Fish and Wildlife Service, U. S. Department of Interior. To date, some 420 samples have been examined. The areas from which samples have been obtained and their distribution throughout the country are given in Chart 1. With each sample collected a brief history was obtained, giving the source of the material and whether a rat virus had been used in the area involved. The source of the specimens are given in Table 6.

Of the 420 specimens examined, 340 were samples of rat excreta and 80 were mice excreta. Seven samples, 1 from mice and 6 from rats, contained *Salmonella*. Two of the rat samples contained *Salmonella morgani* while a total of 5 (1.2 per cent), 1 from mice and 4 from rats, contained food poisoning types of *Salmonella*. Through the coöperation of Dr. K. M. Wheeler, Connecticut State Department of Health, Bureau of Laboratories, Hartford, Conn., and Dr. P. R. Edwards, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Ky., an antigenic analysis of these strains has been made. Strain 31, isolated from mouse excreta obtained in Baltimore, Md., was classi-

TABLE 6

Sources and Numbers of Rat and Mice Pellets Examined and Number Found Positive for Salmonella

Sources	*Number of Specimens*	*Number Positive*
Bakery	10	0
Bottling Plant	2	0
Candy Plant	66	1 (Maryland) mouse
Cotton Gin	3	0
Crab Meat Plant	2	0
Creamery	13	0
Dump	9	1 (California) rat
Farm	31	0
Field	7	0
Granary	37	0
Grocery	36	0
Home	30	0
Mdse. Store	19	0
Meat Packing Plant	29	1 (Colorado) rat
Restaurant	21	* Rat
Warehouse	95	2 (Texas) rat
Unknown	10	0
Total	420	5
Mice 80	Rats 340	

* 2 strains *Sal. morgani*. N. M. & Miss.

fied as *Salmonella typhimurium;* strain 151, isolated from rat excreta obtained in Grasy Horse Canyon, Calif., appeared to be *Salmonella sandiego* although because of conflicting results this strain is still being studied; strain 110, isolated from rat excreta obtained in Denver, Colo., was classified as *Salmonella sp.* (Newington type); and strains 127 and 211, both isolated from rat excreta obtained in Houston, Tex., are classified as strains of *Salmonella anatum.* As far as could be determined, rat virus had not been used in the areas from which samples of excreta containing *Salmonella* were obtained.

DISCUSSION

For a great many years considerable emphasis has been placed on the significance of rats and mice as vectors of food poisoning organisms of the *Salmonella* group; yet only an extremely small number of outbreaks of food infection have been established beyond reasonable doubt as traceable to rodents infected with these organisms. Although the difficulty in obtaining the necessary evidence implicating rodents in an outbreak might be caused by hazards of sampling and limitations of laboratory technic, as pointed out by Staff and Grover,[13] we have had little difficulty in the isolation of *Salmonella enteritidis* from the excreta of naturally infected rats and mice. These studies have shown the strain used is extremely infective for both rats and mice and that it is transmitted from infected animals to cage mates rapidly and in the absence of cannibalism. Very few organisms were required to bring about infection in rats and mice injected by stomach tube while massive doses were necessary to bring about infection and death by intravenous injection. These findings relating to stomach tube feeding are in contrast to those reported by Kligler and Olitzki (*loc. cit.*) who fed massive cultures of *Salmonella enteritidis* to young rats to bring about infection, and concluded that rats are highly resistant to infection with this organism. We feel that undoubtedly these differences in results are related to the invasiveness or virulence of the strain of *Salmonella enteritidis* used. The particular strain used in these studies was originally isolated by Staff and Grover [13] from an epidemic of food poisoning involving 208 cases and 3 deaths in which infected rats had apparently contaminated a cooked cream filling for bakery products.

This investigation has shown that excreta from naturally infected rats may contain living *Salmonella enteritidis* for at least 148 days when kept at room temperature. The small number of virulent *Salmonella* organisms necessary to bring about infection in rats and mice, the ease and rapidity with which infected animals transmit the disease to cage mates in colonies, and the longevity of *Salmonella* in rat excreta cannot be correlated with the paucity of food poisoning outbreaks known to involve these animals. The results of examining some 420 specimens of rat and mice pellets, from which only 5 strains of *Salmonella* of the food poisoning type were isolated, collected throughout the country, however, might explain the dearth of food poisoning outbreaks proved to be the result of infected rodents. It is true that much higher incidences of food poisoning organisms have been reported in rats and mice, but invariably the investigators reporting such figures gathered their animals in a small area, or from a definite source, such as a packinghouse or a bakery and in several instances the studies were carried out because of a recent outbreak. Under such conditions with the apparent ease of transmission of infection in rat colonies higher incidences of infection in a given area might be expected.

Although a much larger series of specimens of rodent excreta need to be

examined from many more areas in the United States before a definite conclusion can be reached, our studies to date indicate that relatively few rodents are infected with food poisoning organisms of the *Salmonella* group. It would appear that this would explain, in part at least, the relatively few outbreaks of food poisoning in which rodents were proved to be vectors of the causative organisms. Nevertheless, since some few rats or mice may be infected with food poisoning organisms, they all must be considered potentially dangerous to health, and every effort should be made to eliminate them from establishments where human food is prepared or stored.

SUMMARY—CONCLUSIONS

Excreta of rats naturally infected with *Salmonella enteritidis* held at room temperature may contain living organisms for at least 148 days.

Infection of rats and mice with very few organisms is possible when a virulent strain of *Salmonella enteritidis* is fed them by stomach tube.

Transfer of infection from an infected animal to cage mates has been carried through 7 colonies with rats and through 3 colonies with mice.

A study of rat and mouse excreta collected in areas throughout the United States indicates that only a small percentage (1.2 per cent) of these animals are excreting food poisoning organisms of the *Salmonella* type.

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A Comparative Study of Standard Agars for Determining Bacterial Counts in Water**

W. L. MALLMANN, PH.D., F.A.P.H.A., AND
ROBERT S. BREED, PH.D., F.A.P.H.A.

Section of Bacteriology, Michigan Agricultural Experiment Station, East Lansing, Mich.; and Chief, Division of Bacteriology, New York Agricultural Experiment Station, Geneva, N. Y.

THE recent introduction of a new standard agar for use in milk control work frequently raises the question whether the new standard agar cannot also be used for making bacterial counts from water samples. The studies reported below give an answer to this question, based on data gathered in two quite widely separated regions. The counts quoted have been obtained from samples analyzed in the Michigan State College Laboratory at East Lansing, Mich., and from samples analyzed in the Geneva City Laboratory at Geneva, N. Y.*

The agars compared were made with the composition and according to the methods outlined in the A.P.H.A. *Standard Methods of Water Analysis* (8th edition) and *Standard Methods for the Examination of Dairy Products* (7th edition). For the purpose of this discussion, they are spoken of as the old † and the new ‡ standard agars. All plates were incubated for 24 hours at 37° C. in incubators that were carefully controlled to prevent variations in temperature above 37° C.

Various types of water samples were tested to obtain a composite picture representing various types of bacterial flora and varying amounts of contamination. The total number of samples examined was 654.

EXPERIMENTAL DATA

The data for each type of water are presented in groups based on the num-

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* The authors are under obligation to Miss C. Cox of East Lansing, Mich., and Mr. R. Eglinton, City Bacteriologist of Geneva, N. Y., for having carried out the analytical work reported here.

† *Old Standard Agar*

Bacto Beef Extract	3 gm.
Bacto Peptone	5 "
Shredded agar	15 "
Distilled water	1,000 cc.

pH between 6.6 and 7.0

‡ *New Standard Agar* (TGEM agar)

Bacto Beef Extract	3 gm.
Bacto Tryptone	5 "
Glucose	1 "
Shredded agar	15 "
Distilled water	1,000 cc.

pH 7.0

10 cc. of skim milk was usually added to this agar just before final sterilization.

** Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.

ber of colonies found on the old standard agar. Four divisions are reported, namely, (1) counts under 6, (2) counts between 6 and 10, (3) counts between 11 and 100, and (4) counts over 100. Averages are reported as the counts for each group cover a narrow band without extreme minima and maxima.

Average bacterial counts are also presented for parallel plates when one medium gave sterile plates.

The data for each type of water are presented in Tables 1 to 5 inclusive. In Tables 1 and 2 swimming pool and well waters respectively show relatively high counts on the new standard agar when the parallel old standard agar plates failed to show colonies. Conversely, when the new standard agar plates were sterile, the counts on the parallel old standard agar plates were relatively low.

TABLE 1

Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Swimming Pool Waters

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	23	0	10.9
Zero on new agar	14	4.1	0.0
On old agar under 6	66	2.04	9.63
On old agar 6–10	9	7.7	7.5
On old agar 11–100	26	35.0	48.0
On old agar above 100	9	265.0	420.0

TABLE 2

Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Well Waters

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	52	0	17.7
Zero on new agar	21	1.0	0
On old agar under 6	186	1.25	8.7
On old agar 6–10	19	7.5	19.7
On old agar 11–100	49	34.5	63.9
On old agar over 100	17	269.0	345.0

TABLE 3

Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Treated Lake Waters

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	12	0	2.58
Zero on new agar	13	1.77	0
On old agar under 6	63	1.81	3.13
On old agar 6–10	8	6.0	3.37
On old agar 11–100	1	12.0	4.0
On old agar over 100	0	0	0

TABLE 4

Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Raw Lake Water

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	—	—	—
Zero on new agar	—	—	—
On old agar under 6	3	2.0	4.66
On old agar 6–10	10	7.4	9.9
On old agar 11–100	23	32.4	37.52
On old agar over 100	10	210.0	195.4

TABLE 5

Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Chlorinated Sewage Effluents

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	—	—	—
Zero on new agar	—	—	—
On old agar under 6	1	2	4
On old agar 6–10	2	9.5	14
On old agar 11–100	58	51.1	81.1
On old agar over 100	46	692.8	845.8

TABLE 6

Distribution of Bacteria Counts on New Standard Agar When Parallel Old Standard Agar Plates were Sterile

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
On new agar under 6	71	0	1.7
On new agar 6–10	3	0	6.0
On new agar 11–100	10	0	28.8
On new agar over 100	3	0	142.0

TABLE 7

Comparative Bacteria Counts on Old Standard Agar and New Standard Agar on Various Types of Water

Bacteria Count Groupings	No. of Samples	Average Count	
		Old Agar	New Agar
Zero on old agar	87	0	14
Zero on new agar	48	5	0
On old agar under 6	319	1.2	3.14
On old agar 6–10	48	7.5	12.41
On old agar 11–100	157	34.1	50.6
On old agar over 100	82	490.5	602.5

A total of 87 samples (Table 7) gave an average of 14 bacteria per cc. on the new standard agar when the parallel old standard agar plates were sterile. In Table 6 the 87 samples are separated into 4 groups, counts under 6, counts between 6 and 10, counts between 11 and 100, and counts over 100. Seventy-one samples showed counts under 6, with an average of 1.70, but 10 samples showed an average count of 28, and 3 had an average of 128. These data are significant in demonstrating the inability of the old standard agar to develop all of the bacteria present capable of growth at 37° C. Out of 654 samples of water examined, 71, or 12.4 per cent, of the old standard agar counts would have been reported with bacteria counts of zero. In industrial applications where the absence of bacteria in a water supply is important, the use of the new standard agar is indicated.

As the number of bacteria in the waters increased, the difference in counts between the media decreased, although as shown in Table 7 the new standard agar consistently shows a higher bacteria count. The differences are not significant and would not be likely to change the sanitary or industrial rating of any water where bacteria counts are used as a measure of water quality.

DISCUSSION

Additional comparative data showing similar results secured from clear and contaminated water supplies with plates incubated at lower temperatures should be studied. It is well known that more colonies develop from ordinary water samples when plates are incubated at 20° C. for 48 hours. It may well be that some of these larger counts would be increased more than others when the new standard agar is used. If so, this would give the new agar a greater differential value than the old.

The addition of skim milk to the new agar is not felt to be necessary when water samples are to be examined. In fact, some of the counts used in this work were obtained from new agar to which no milk had been added. Milk is added when the agar is used for plating milk samples only because it is unavoidably present in sufficient quantity to affect the growth of colonies wherever dilutions are 1:10 or less. In order to get comparable results from all dilutions it is necessary to add the milk in all cases where dilutions are greater than 1:10.

SUMMARY

Counts made from new standard agar plates were relatively high when the parallel old standard plates were sterile.

When the old standard agar plates showed counts of 5 or more colonies, parallel new standard agar plates gave higher average counts, but these were not sufficiently higher to make the differences significant.

The data indicate that the new standard agar could be substituted for the old standard agar for determining the bacterial content of water supplies without causing significant misinterpretations of data.

Clinical Manifestations of Ariboflavinosis*

V. P. SYDENSTRICKER, M.D.

Professor of Medicine, University of Georgia School of Medicine, Augusta, Ga.

SINCE the signs of riboflavin deficiency in human beings have been identified, it has become evident that this avitaminosis is exceedingly common and that its recognition is quite important in estimating the nutritional state. The facial and labial lesions of ariboflavinosis contribute largely to the typical facies of classic pellagra and with glossitis constitute the picture of "pellagra sine pellagra." Stannus [1] in 1912 described "angular stomatitis" associated with glossitis as "pellagra fruste." Goldberger and his collaborators [2, 3] noted the labial lesions and facial seborrhea occurring in the absence of typical dermatitis and suspected the influence of two distinct dietary factors in pellagra. Many other observers have described similar types of localized dermatitis of the face with "perleche" and glossitis curable with yeast.[4-8] Moore [8] found that nicotinic acid did not cure this syndrome but that autoclaved yeast was effective and concluded that deficiency of some other factor than nicotinic acid was the cause. Ocular disturbances in association with sore tongue, sore mouth, inflammation of the nasal mucosa, and at times dermatitis of the genitalia have been stressed by observers in the tropics for a century.[9-11] Moore [8, 11, 12, 13, 14] has described this syndrome in detail; his illustrations show that the facial and oral lesions are typical of ariboflavinosis.

It is recognized that beriberi and pellagra are major syndromes of B group avitaminosis resulting from prolonged subtotal deficiency of the whole B complex. The factors contributing to the development of endemic ariboflavinosis are probably identical. A diet containing a marked excess of carbohydrate over the amount of vitamin necessary for the utilization of the energy derived from it is most important. Defects in absorption, storage, and utilization of the vitamins are almost equally effective. Increased metabolic requirement in the sense of increased derivation of energy from carbohydrate, in the presence of a relatively fixed vitamin intake, is a common source of disease. Vomiting, diarrhea, and edema of the gastrointestinal tract are frequent causes of poor absorption; hepatic disease seems to be an important factor in failure of storage and utilization. Unusual physical exertion, pregnancy, fever, hyperthyroidism, alcoholism, and therapeutic administration of large amounts of dextrose intravenously are common causes of increased utilization of energy. Aside from dietary selection, the factors which determine the predominant avitaminosis in a given case are often obscure.

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Thiamin, nicotinic acid, and riboflavin are components of coenzymes essential to the intermediate metabolism of carbohydrate, when any one of the three vitamins is exhausted from failure of replacement, or possibly when there is a marked failure of balanced intake of the three, a complex disturbance of carbohydrate metabolism results. In addition to coenzyme activity at various stages of the dehydrogenation of hexoses, riboflavin is the active fraction of the yellow respiratory ferment of Warburg. The processes of intracellular respiration are dependent on it and it is thought to be ubiquitous in living cells. Because of its multiple functions it is not surprising that deficiency of riboflavin should be frequent and that the manifestations of deficiency should be varied. There is evidence that other vitamins of the B group have a definite influence on the utilization of riboflavin. Very frequently the administration of large amounts of nicotinic acid to pellagrins maintained on an inadequate diet causes the rapid development of signs of ariboflavinosis after the cure of typical pellagrous glossitis and dermatitis.[15] This phenomenon suggests that the biochemical activity of nicotinic acid involves the utilization of riboflavin, there being as yet no clinical evidence that the converse is true. In certain cases of ariboflavinosis, treatment with riboflavin produces only partial cure of cheilosis and superficial vascular keratitis, the addition of vitamin B6 causes rapid completion of healing.[16] In other instances cure of cheilosis typical of riboflavin deficiency has been brought about by the administration of vitamin B6 alone.[17] There is reason to believe that vitamin B6 mobilizes riboflavin from storage or dissociates it from some combination which is not physiologically active.[16] Pantothenic acid may have a similar action.[16, 18]

Almost nothing is known of the pathology of ariboflavinosis. Lesions of the skin and mucous membranes may be due to local disturbances of cellular nutrition and respiration. Changes in the eyes are best explained as compensatory phenomena to local cellular anoxemia. Bessey and Wolbach [19] suspected that vascularization of the cornea was such a response, they suggested that the normal respiration of the avascular corneal tissues depends on the transport of oxygen from the epithelium to the deeper layers by riboflavin. In the absence of an adequate supply of the vitamin in the cells of the cornea, anoxemia results and capillaries invade the tissues to supply oxygen directly from erythrocytes. It is likely that there is etiological as well as apparent similarity between the fatty infiltration of the liver which occurs in animals deprived of riboflavin and the fatty liver of fatal pellagra.[20, 21] Anemia is much less frequent in ariboflavinosis than in pellagra and there is no anemia from lack of the vitamin when the diet contains an adequate amount of iron.[22] Gastric achlorhydria has been present in approximately 50 per cent of personally observed instances of ariboflavinosis but apparently has not the direct relation to this syndrome that it has to endemic pellagra. It may have much influence on the riboflavin requirement of the individual and on the tendency to relapse.

SYMPTOMS AND SIGNS OF RIBOFLAVIN DEFICIENCY

The symptoms of riboflavin deficiency are numerous and many are common to all avitaminoses. Nervousness, irritability, anorexia, gastric discomfort, and ready fatigue are entirely nonspecific and probably are the result of multiple deficiencies. Soreness of the lips and tongue and dysphagia from tenderness of the tongue and fauces are characteristic. There is not the sensitiveness to hot or highly seasoned food that is

present in nicotinic acid deficiency, nor is there the severe dysphagia due to esophagitis. Pruritus of the vulva or scrotum may be present. In more than half the cases of ariboflavinosis which we have observed, ocular symptoms have preceded any others, they have been present at some time in over 90 per cent. Photophobia, burning and itching of the eyes, a sensation of eye-strain or rapid visual fatigue, poor distant vision and blurred vision in poor light or twilight are specific symptoms. Occurring in the absence of gross refractive error or conjunctival infection, they are highly suggestive of ariboflavinosis. The similarity of these complaints to those occurring in vitamin A deficiency has led to much confusion in their interpretation.[23, 24]

The physical signs of ariboflavinosis are specific and there is a rich experimental background for their correlation with lesions produced in various species of animals. No observer had separated them from the syndrome of endemic pellagra prior to the report of Sebrell and Butler [25] on the lesions occurring in a group of patients maintained on an experimental diet exceedingly poor in riboflavin but well supplemented with other vitamins. Under the conditions of their experiment the first sign to appear was cheilosis. There was maceration at the commissures of the lips with redness and some desquamation of the lips along the line of closure. Redness spread to the buccal surfaces of the lips, fissures developed at the commissures. Mild seborrheic dermatitis occurred in the nasolabial folds, on the alae nasi, and occasionally on the ears and eyelids. Later observations have shown that fissures of the commissures of the eyelids may develop, and that indolent ulcerations of the nasal septum are not infrequent, fissures sometimes occur on either side of the septum at the nasal orifices. The secretion of the sebaceous glands of the face seems to be altered so that inspissated, almost hair-like comedones are apt to develop over the forehead, malar eminences, nose and chin—this "shark-skin eruption" frequently has been emphasized in the description of classic pellagra. The tongue becomes clean, the papillae flattened or mushroom-shaped rather than atrophic as in nicotinic acid deficiency. The color of the tongue is characteristic, the normal pink is replaced by a purplish-red or magenta quite different from the scarlet of nicotinic acid deficiency.[26, 27] The color and texture of the tongue are important in differentiating ariboflavinosis from nicotinic acid deficiency. In addition to localized seborrheic lesions of the face and ears, generalized seborrheic dermatitis may be a manifestation of riboflavin deficiency; we have seen 4 patients in whom extensive seborrhea healed without local treatment during the administration of riboflavin for the cure of coincident specific oral and ocular lesions. More rarely dry, brown, itching dermatitis of the hands and scrotum or vulva present in patients with typical cheilosis and glossitis has healed during treatment instituted for typical signs of riboflavin deficiency. The specific nature of such dermatoses is yet to be determined.

OCULAR MANIFESTATIONS

The ocular manifestations of riboflavin deficiency are of special interest and importance. There have been many references to the occurrence of visual disturbances in association with signs now known to be due to ariboflavinosis. Time does not permit discussion of the extensive experimental work of Day and his collaborators,[28-33] of O'Brien,[34] and others. For years it has been known that so-called ophthalmia as well as cataract could be produced in rats by a diet deficient in the heat stable fraction of yeast. Bessey and Wolbach [19] first used the slit lamp to study the

progress of ocular changes in rats deprived of riboflavin, and followed their observations during life with india-ink injection and histological examination post-mortem. They found that superficial vascularization of the cornea was the earliest sign of riboflavin deficiency. As avitaminosis progressed, superficial and interstitial nebulae developed in the cornea, later there was invasion of the deeper layers by newly formed capillaries until extensive vascular networks were produced. The process could be arrested at any time by the administration of riboflavin, new vessels rapidly became empty of blood but remained visible for many months. These observations were confirmed in all essential details by the almost simultaneous report of Eckardt and Johnson.[35] The majority of clinical students of nutritional disease have been impressed with the prevalence of ocular complaints in patients presenting evidence of B group vitamin deficiency. Reference has been made to numerous observers in the tropics. Spies, Vilter, and Ashe[23] noted histories of visual impairment or burning of the eyes associated with conjunctivitis or mydriasis in 70 per cent of their patients. Spies studied a group of 50 patients with ocular complaints.[24] While these observers were inclined to attribute the symptoms and signs to vitamin A deficiency, they noted that a number of patients were relieved by the administration of riboflavin. Pock-Steen[36] gave an accurate description of ocular symptoms occurring in a rather large group of patients with sprue. This author suspected that they might be due to riboflavin deficiency and was able to secure rapid cure with small amounts of the vitamin in over 90 per cent of cases.

During the past year and a half our group has paid special attention to the ocular complaints of patients with oral signs of ariboflavinosis and to the examination with a slit lamp of their eyes at various stages in the development of mouth and skin lesions, as well as during periods of treatment. Many of these individuals were allowed to relapse after cure had been effected with riboflavin. Corneal vascularization was found to be constantly present when other signs of ariboflavinosis could be recognized except in a few patients with marked arcus senilis. All grades of vascularization were observed, and it seems possible to reconstruct the whole sequence of events from the many fragments of the picture. At the same time we studied the eyes of a group of apparently normal persons who complained only of visual disturbances, particularly photophobia, ocular fatigue, and dim vision not improved by correction of refractive errors. Among these were seen the earliest stages of corneal vascularization as well as several well advanced instances of keratitis. Mydriasis and defects of accommodation were common in this group and probably contributed to the symptoms of photophobia and poor distant vision.[27, 37]

The earliest and most frequent sign of ariboflavinosis is slight circumcorneal congestion, frequently visible with a hand lens or ophthalmoscope before it can be seen by the unaided eye. In such cases the slit lamp shows proliferation and marked congestion of the limbic plexus; there are many newly formed capillaries which obliterate the normal avascular zone between the plexus and the sclero-corneal junction. Each scleral digitation is apt to be outlined by capillaries which form a more or less complete arcade but do not yet encroach on the cornea. Within a few days, sometimes only one or two, empty capillaries can be seen sprouting from the apices of the loops of the limbic arcade; these "sprouts" lie just beneath the epithelium and grow centripetally; in from 2 to 4 days clumps of red blood cells circulate through them making

irregular, jerky progress; at this stage the deeper efferent limb of the loop cannot be clearly seen. Such vessels tend to grow rapidly and form anastomoses with adjacent capillaries to form a secondary arcade lying within the cornea. From this, secondary capillary sprouts develop and grow centripetally, anastomosing freely until an extensive superficial plexus is formed which may cover the peripheral two-thirds of the cornea. Much later, deeper vessels, which invade the substantia propria at all levels, spring from the limbic plexus, and eventually a scanty posterior plexus may be formed which lies just proximal to Descemet's membrane. It seems characteristic of the keratitis of ariboflavinosis that vascularization is predominantly anterior. In long standing cases which have undergone repeated relapses, very extensive corneal vascularization may be seen with large vessels at all levels, but a posterior plexus is never prominent. Early in some cases, but usually after prolonged deficiency, diffuse nebulae develop at various levels; quite frequently there are fine superficial punctate opacities. A few patients with extensive vascularization had large scars, almost certainly the result of corneal ulcers.

The response of nutritional keratitis to treatment has been prompt and often spectacular. The stage of congestion and proliferation of the limbic plexus was identified as a sign of deficiency only after the plexus had been seen to return to a normal state after the administration of riboflavin. Depending on the extent of vascularization and the size of the vessels present, it may require from 2 to 10 days for occlusion to occur. Large vessels, the result of very chronic deficiency or complicating corneal ulcers, may never become occluded. The first evidence of healing is interruption of the columns of blood in the capillaries producing a "beaded" appearance; 2 or 3 days later the vessels are empty or contain scattered clumps of red cells which are stationary and eventually disintegrate. The empty vessels remain visible for at least a year. Nebulae resolve slowly, often requiring 3 weeks for absorption.

Recently Johnson and Eckardt [38] reported the cure of rosacea keratitis in 32 of 36 patients treated with riboflavin; in 9 cases cutaneous rosacea was also present. These authors did not mention the incidence of oral lesions of ariboflavinosis but did note the similarity of the corneal vascularization to that observed in rats with experimental riboflavin deficiency. It is quite likely that the syndrome designated "rosacea" by dermatologists and ophthalmologists would be called ariboflavinosis by an observer interested in nutritional disease.

Iritis has been seen in 5 instances where keratitis and cheilosis were present, in each case iritis subsided during treatment with riboflavin. Accumulations of pigment, probably of pigment bearing wandering cells, on the anterior surface of the iris was observed in 24 of our patients. On grey irises this pigment occurred in irregular clumps which we cannot distinguish from "hazel spots"; brown irises have a shaggy, smoothed-out appearance due to veiling of the normal architecture. Such pigmentation was recognized as abnormal only after it was seen to disappear during treatment.

The amount of riboflavin required for satisfactory treatment in any case is conditioned by the adequacy of the diet which can be furnished and by the ability of the patient to extract dietary riboflavin from food sources. Under experimental conditions with a diet extremely poor in the vitamin, 5 mg.* daily has been the average dose required

* Riboflavin employed in our investigations has been the pure crystalline synthetic vitamin furnished by Merck & Co., E. R. Squibb & Sons, and the Winthrop Chemical Co. Riboflavin-sodium for injection was furnished by Merck & Co.

for rapid cure, in the presence of diarrhea, irreversible gastric achlorhydria or severe hepatic disease, 10 or even 15 mg. a day may be required when given by mouth. Under uncontrolled conditions with a tolerably adequate diet, 3 mg. daily is adequate for cure and maintenance of the great majority of patients. In extremely depleted patients with polyavitaminosis of severe grade, 10 mg. daily of riboflavin-sodium given intravenously is not an excessive amount.

It is almost superfluous to say that dietary treatment should never be neglected. Ariboflavinosis is the syndrome of "pellagra sine pellagra" and though the distinctive manifestations may be those of riboflavin deficiency alone, B group deficiency probably exists in every instance. Dietary habits, economic stress, or coincident disturbance of the gastrointestinal apparatus may determine the predominant avitaminosis.

When it can be administered and digested, the usual 60 to 90 gm. daily ration of yeast curative for pellagra contains ample amounts of riboflavin as well as the other vitamins needed for adequate nutrition. It is doubtful whether riboflavin should be given over long periods without making sure that other members of the B group are supplied by food, by yeast or the pure vitamins.

The recognition of ariboflavinosis as a syndrome is of much interest, it is of even more importance. Early corneal vascularization is visible with a slit lamp before any gross signs such as cheilosis or glossitis have developed. This method of examination is probably the most delicate test available for deficiency of the B group of vitamins.

SUMMARY

Since the signs of "pellagra sine pellagra" have been shown to be due to deficiency of riboflavin in the diet, it has become possible to correlate many observations on nutritional disease which have seemed contradictory. Ariboflavinosis, like pellagra and beriberi, is a manifestation of B group avitaminosis. The specific signs probably result from a complex disturbance of the coenzyme functions of the B vitamins as a group, to which is added failure of the activity of riboflavin in intracellular oxidation.

Riboflavin deficiency is characterized by photophobia and dimness of vision at a distance and in dim light; cheilosis, seborrheic lesions about the ears and nose, and a specific sort of glossitis. Examination of the eyes may show mydriasis and defects of accommodation. The earliest and most constant finding is a superficial vascularization of the cornea. This may progress to severe interstitial keratitis. Therapeutic tests have shown that rosacea keratitis also is due to deficiency of riboflavin. A few patients with syphilitic keratitis have shown remarkable improvement during the administration of this vitamin.

Recognition of the early ocular signs of riboflavin deficiency offers an easy method of identifying B group avitaminosis at a stage when no gross signs are present.

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Determination and Characterization of Coliform Bacteria from Chlorinated Waters*

MAX LEVINE, PH.D., F.A.P.H.A.

Professor in Charge, Department of Bacteriology, and Bacteriologist, Engineering Experiment Station, Iowa State College, Ames, Ia.

THE term "coliform" was suggested by Breed and Norton to include those aerobic facultatively anaerobic Gram-negative non-spore-forming organisms which ferment lactose with gas formation. The term "coliform" might, however, be considered to connote all organisms which resemble *Escherichia coli* morphologically. In view of the fact that the term was first suggested for application in the field of water bacteriology where only the 37° C. temperature of incubation is employed, gasification at this high temperature is implied. The question naturally arises as to whether organisms which produce gas from lactose only slowly or not at all at 37° C. but vigorously at lower temperatures (20° to 30° C.) are to be included in the "coliform" group. In this communication the term "coliform group" will be employed, as suggested by Stuart, Mickle, and Borman, to include all non-spore-forming Gram-negative bacteria irrespective of the temperature at which gas is produced from lactose.

Heterogeneity of the coliform group coupled with repeated observations that certain types appeared to be associated with specific sources, though this association is not generally a perfect one, holds forth the hope of detection, eventually, of a high degree of correlation between the incidence of certain coliform types and sanitary significance. Numerous criteria have been suggested for the differentiation of coliform organisms with a view to the detection of such types. Among these criteria are included (1) ability to ferment various carbohydrates; (2) the nature of the products produced in the dissimilation of glucose, such, for example, as the relative quantities of acid, hydrogen, carbon dioxide, and acetylmethylcarbinol; (3) the production of hydrogen sulfide and indol from appropriate nitrogenous media; (4) the availability of citric and other organic acids as sources of carbon, or (5) uric and other nitrogenous compounds as sole sources of nitrogen; and (6) attention is being particularly called to the importance of the effect of temperature on the dissimilative properties and growth of this group of bacteria.

Of the numerous differential reactions studied, several have become generally recognized as particularly useful. These include indol, the methyl red test, the Voges-Proskauer reaction and citrate utilization (for which Parr succinctly suggested the term "I.M.V.i.C" reac-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 11, 1940.

tions) to which should now be added temperature relationships.

The indol test has long been considered of fundamental significance. Thus the English have repeatedly called attention to the importance of the indol positive varieties in interpretation of water analyses and the recommendation of the Eijkman test by the German bacteriologists, since the high temperature of incubation eliminates, for the most part, the indol-negative strains, also serves to emphasize the sanitary significance of the indol-positive strains. The greatest objection to the indol test has been its cumbersomeness. The old technic for detection required incubation periods of 5 days or longer, and the test reagents were not as specific as desirable. The introduction of tryptophane broth and such technics as the Goré test and Kovac's reagent have made it possible to detect indol in 24 hour cultures. This reaction may well resume its former prominence and significance.

The methyl red reaction is the resultant of the rate of acid production, the maximum acidity produced and acid utilization, in a suitably buffered medium. The temperature of incubation, concentration of nutrients, and period of incubation, are all vital for reliable and duplicable results. It is based on the following principle as pointed out by Clark and Lubs. If the amount of glucose in a medium is restricted to that quantity necessary to yield the limiting (inhibiting) hydrogen ion concentration for *Escherichia coli* the acidity resulting from growth of *Aerobacter aerogenes* in the same medium would necessarily be below that required for inhibition since the latter organism produces considerably less acid per unit weight of glucose decomposed. On prolonged incubation in such a medium the *Escherichia* strains would produce a high permanent acidity, whereas cultures of *Aerobacter* would continue to grow, eventually exhausting the available sugar and decomposing the intermediate acid products to carbonates and bicarbonates, with the result that the cultures become progressively more alkaline. In a carefully stipulated medium at a temperature of 30° C. an incubation period of 5 days was found necessary by Clark and Lubs for dependable differentiation—the *Escherichia* strains remaining acid whereas the *Aerobacter* strains became alkaline to the indicator methyl red. The tendency of water bacteriologists to disregard the limitations stipulated by Clark and Lubs for the determination of this reaction has lead to considerable confusion in the literature.

We have on numerous occasions observed cultures which were acid to methyl red at 37° C. in 3 or 4 days, whereas they were distinctly alkaline when incubated for the same period at 30° C. Stuart, Mickle, and Borman report many strains which are alkaline to methyl red at 20° C. but acid at 37° C. It is not surprising, therefore, that many nonconforming cultures (as respects the anticipated reaction to methyl red on the basis of other characteristics observed) have been reported which would have been considered standard strains were it not for the idiosyncrasies of the investigator.

The recommendation in the 8th edition of the *Standard Methods of Water Analysis* for the determination of the methyl red test after 3 or 4 days at 37° C. is conducive to the suppression of the number of methyl red alkaline reactions, with the result that *Aerobacter* strains are erroneously allocated to the *Escherichia* or intermediate sections.

Because of the confusion in the literature due to the frequent disregard of the influence of temperature and the period of incubation on the methyl red test, it is suggested that this differential criterion might well be dispensed with,

particularly when employing the Voges-Proskauer reaction with which it shows such a high degree of correlation when the two tests are properly performed.

The Voges-Proskauer reaction, which consists of the determination of the presence of acetylmethylcarbinol, is generally accepted as a particularly important criterion for differentiation of the *Aerogenes* from the *Escherichia* sections. The 8th edition of the *Standard Methods of Water Analysis* recommends the addition of 10 per cent potassium hydroxide to Difco V.P. broth cultures incubated for 24 to 48 hours at 37° C. Recently, Barritt (1936) suggested a technic consisting of the addition of 0.6 cc. of 5 per cent alpha naphthol in absolute ethyl alcohol and 0.2 cc. of 40 per cent potassium hydroxide per cc. of culture medium as a more delicate reagent for the detection of acetylmethylcarbinol.

Observations on several hundred coliform bacteria indicated the marked influence of temperature of incubation and test reagent on the frequency of detection of strains which are positive to the Voges-Proskauer test. The results are summarized in Table 1.

TABLE 1

Effect of Temperature and Test Reagent on V.P. Reactions of 221 Coliform Strains

Incubation →	*24 Hours*	*48 Hours*
Test Reagent	*No. Positive at 37° C.*	
10% KOH	21	26
α-Naphthol	44	44
	No. Positive at 30° C.	
10% KOH	45	48
α-Naphthol	51	51

Considering first, the effect of the test reagent, it will be noted that a great many more positive reactions were detected with the *a*-naphthol than with potassium hydroxide. It will be noted further, that the number of positive reactions was greater when incubation was at 30° C. than was the case at the higher temperature of 37° C. and that this was particularly true when employing potassium hydroxide as the test reagent. At 37° C. 44 positive Voges-Proskauer tests were obtained with the *a*-naphthol reagent as compared to 21 positive reactions with the Standard Methods technic (employing 10 per cent potassium hydroxide) after an incubation period of 24 hours, and the number of positive reactions rose but slightly, to 26, when the incubation period was prolonged to 48 hours.

At the lower temperature (30° C.), 51 positive strains were detected by the *a*-naphthol reagent as compared with 45 after 24 hours, and 48 at 48 hours' incubation when employing the potassium hydroxide reagent.

It is quite evident that the *a*-naphthol reagent is a more delicate indicator for acetylmethylcarbinol than is the Standard Methods technic and that the differences are particularly marked at the high temperature (37° C.) of incubation. The Standard Methods technic is therefore conducive to the suppression of the number of positive Voges-Proskauer tests so that the results obtained tend to allocate strains that should be considered in the *Aerobacter* section to the *Escherichia* or "Intermediate" sections.

With such cultures as we have had occasion to observe, employing temperatures of 30° and 37° C., no differences in their ability to utilize citrate were noted. Stuart, Mickle, and Borman note, however, that a number of their strains utilized citrate as a sole source of carbon at 20° C. but not at 37° C.

There have been numerous reports in the past decade on what are referred to as "slow lactose fermenters" or preferably "aberrant" strains. Some water analysts are inclined to disregard these, particularly if less than 5 per cent (or even 10 per cent) gas is formed after 48 hours at 37° C. Many such aberrant coliform strains produce goodly quanti-

ties of gas at lower temperatures (20° to 30° C.) and in some of the suggested presumptive test media even at the higher temperature of 37° C.

TABLE 2

Gas Production by 92 Strains of "Slow" Lactose Fermenters Isolated from Chlorinated Waters

	Producing 10 Per cent or More Gas at 37° C. in 48 Hours	
Medium	*Number*	*Per cent* *
Lactose Broth	0.0	0.0
Lauter-Dominick	44	48
MacConkey Broth	52	57
Brilliant Green Bile (2%)	50	54
Brilliant Green Bile (5%)	52	57
Neutral Red	64	70
Formate Ricinoleate Broth	71	77

* Per cent in round numbers

From Table 2 it will be noted that of 92 strains which produced less than 10 per cent gas in standard lactose broth in 48 hours at 37° C. (all of these were vigorous gas formers at 30° C.), about 52 (57 per cent) of the strains produced 10 per cent or more gas at 37° C. in MacConkey broth and brilliant green bile. An even larger proportion, 70 to 77 per cent, produced goodly amounts of gas from neutral red and formate ricinoleate broth. The results illustrate that constituents of the medium (other than lactose) as well as temperature may influence the lactose dissimilating activities of an organism and are also illustrative of the difficulties encountered in characterizing what is meant by the term "slow lactose fermenter."

The question as to the origin of these "slow lactose fermenters" is a moot one. It may be significant to note that up to the present we have encountered them almost exclusively in water during the summer season.

Stuart, Mickle, and Borman suggest the term "micro-aerogenic coliforms" for those strains which produce only a small amount of gas at both 37° C. and 20° C. They feel that such cultures, which might be considered to be the "true slow lactose fermenters," probably have the same sanitary significance as the more typical coliform organisms.

For those strains which ferment lactose poorly at 37° C. but are vigorous gas formers at the lower temperature (20° C.), they suggest the term "pseudo - micro - aerogenic coliforms." They consider this latter group of no sanitary significance because they did not obtain a single culture falling into this category from 600 fecal specimens examined, nor did they encounter an organism of this type which could be allocated to the genus *Escherichia* in a study of more than 10,000 coliform organisms from various sources.

From a study of 196 coliform strains isolated from chlorinated water, 113 produced more than 10 per cent gas at 37° C., and are considered to be normal coliform strains, whereas 83 fell into the category of "aberrant coliform" bacteria. Allocation of 189 of these strains, for which data are available, among the sections of coliform bacilli and their reactions with respect to indol, is indicated in Table 3. Of these aberrant strains, 15 fall into the category of "micro-aerogenic," and the remaining 68 produced gas slowly, if at all, at 37° C. (frequently requiring 96 hours for gas formation) but very luxuriantly, as a rule, at 30° C. (lower temperatures were not employed) and may be tentatively considered to fall into the class of "pseudo-micro-aerogenic" coliform bacilli. Practically all of these strains were isolated from the same source—Lake Michigan chlorinated, but not filtered, water supplies. It is rather interesting to note that only one of the strains was obtained from samples submitted during the winter, whereas the remaining 67 cultures were isolated from summer samples. It was

TABLE 3

Distribution of Coliform Bacteria Isolated from Chlorinated Water with Respect to Season of Isolation, Aerogenic Properties and Allocation to Sections of Coliform Group

Section		*Aerobacter*		*Escherichia*		*Intermediate*		*Total*
		V.P.+	*Cit.+*	*V.P.—*	*Cit.—*	*V.P.—*	*Cit.+*	
Indol		+	—	+	—	+	—	
Gas from Lactose Broth	*Modified Stuart Grouping*	*No. of Strains from Winter Samples*						
>10% at 37° C. >10% at 30° C.	Normal	1	11	7	..	4	7	30
<10% at 37° C. <10% at 30° C.	Micro-aerogenic	..	3	..	..	1	..	4
<10% at 37° C. >10% at 30° C.	Pseudo-micro-aerogenic	..	1	..	..	..	..	1
Total		1	15	7	..	5	7	35
		No. of Strains from Summer Samples						
>10% at 37° C. >10% at 30° C.	Normal	4	32	3	2	2	33	76
<10% at 37° C. <10% at 30° C.	Micro-aerogenic	..	4	1	3	..	3	11
<10% at 37° C. >10% at 30° C.	Pseudo-micro-aerogenic	..	29	2	9	5	22	67
Total		4	65	6	14	7	58	154

suggested that they probably represented soil forms, washed in with the spring rains, which were possibly allied to the plant pathogens at least with respect to their growth temperature relationships.

Of these 68 "pseudo-micro-aerogenic" strains, 30 were allocated to the *Aerobacter* section—all being Voges-Proskauer-positive, citrate-positive and indol-negative; 27 were considered to be in the "intermediate" section, being Voges-Proskauer-negative, citrate-positive (among these were included 5 strains which produced indol), and the remaining 11 strains were tentatively placed in the *Escherichia* section on the basis that they were V.P.-negative and citrate-negative (only two produced indol).

Stuart, *et al.* pointed out that they failed to encounter any strains of the genus *Escherichia* among the cultures they considered to be "pseudo-micro-aerogenic." Of the 11 presumably "pseudo-micro aerogenic" strains in this study tentatively allocated to the *Escherichia* section, only 2 would have been so classified on the basis of being indol-positive and citrate-negative, and it should be further noted that our observations were restricted to the temperatures range of 30° C. to 43° C. and that the possibility of mixed cultures always exists.

The introduction of surface tension reducing compounds into media for elimination of lactose fermenting organisms, particularly spore formers, responsible for spurious presumptive tests, has been extensively studied by Mallmann. The following limited observations are presented to supplement his more extensive work.

Among 630 standard lactose broth tubes inoculated with 10 cc. portions of chlorinated water, 94 positive presumptive tests were obtained (see Table 4).

TABLE 4

Comparison of Lactose Broth and Tryptose-Lauryl-Sulfate Lactose Broth for Detection of Coliform Bacteria in Chlorinated Water

Enrichment Medium	*Tubes Planted*	*Positive Presumptive Tests*	*Gas in B.G. Bile from Pos. Pres. Test*	*Completely Confirmed from Pos. Pres Test*
		No. of Tubes after 48 Hours		
Lactose Broth	630	94	20	9
Tryptose Broth	630	11	10	10
		No. of Tubes after 96 Hours		
Lactose Broth	630	205	32	18
Tryptose Broth	630	23	17	16

Data obtained in conjunction with studies on the bacteriology of chlorinated water supported by a grant from the Wallace & Tiernan Co., Inc.

Of these, 20 showed gas when transferred to brilliant green bile as recommended for the partially confirmed test in Standard Methods. Only 9 of the positive presumptive lactose broth tubes were confirmed by the completed test (eosine-methylene-blue agar to ricinoleate broth, etc.). From the 630 duplicate 10 cc. portions of water inoculated into tryptose-lauryl-sulfate lactose broth only 11 positive presumptive tests were obtained of which 10 produced gas when transferred to brilliant green bile and 10 positive confirmations were obtained by the E.M.B. agar and ricinoleate broth completed test technic. It is quite evident that the tryptose medium tremendously reduced the number of spurious presumptive tests.

Upon further incubation (96 hours) of the lactose broth presumptive test medium, 205 tubes were positive, of which 32 showed gas in brilliant green bile sub-plants and 18 positive confirmations were obtained employing the completed test as described above. With the tryptose-lauryl-sulfate medium the number of positive presumptive tests rose to 23, of which 17 showed gas in brilliant green bile transfers and 16 positive confirmations were obtained by the completed test.

It is apparent therefore that the brilliant green bile (2 per cent) partially confirmed test eliminated a large proportion of spurious presumptive tests, though permitting a number of non-coliform organisms, presumably spore formers, to grow, and that for the limited number of samples studied, the tryptose-lauryl-sulfate presumptive test was a more dependable index of the probable presence of coliform bacteria than the brilliant green partially confirmed test. It appears from the few data which are presented that slow lactose fermenters were not eliminated by the tryptose medium.

The difference in the number of completely confirmed tests using lactose broth and the tryptose medium is not significant because of the small number of observations on completed tests confirmed, but it is interesting to note that in one instance what appeared to be a typical coliform organism on eosine-methylene-blue agar (the colonies had a distinct sheen but differed from typical *Escherichia* in that they were not discrete but coalesced) did not show gas in the tryptose-lauryl-sulfate medium when first isolated, and was a slow fermenter.

The characteristics of a peculiar organism isolated from chlorinated water may be of some interest at this time.*

* A detailed report is in preparation by J. M. Coblentz of the Iowa Engr. Exper. Sta., who detected the culture.

The organism in question conforms to the characterization of the coliform group of bacteria as stipulated in the *Standard Methods of Water Analysis*, namely, it is a Gram-negative non-spore-forming rod, ferments lactose with gas production, and grows aerobically, but it was found to be extremely more resistant to chlorination than are the typical coliform bacteria. In a phosphate buffered water, at pH 7 in which typical cultures of *Escherichia coli* were killed in 10 to 15 minutes upon the addition of 0.5 p.p.m. available chlorine, this organism survived for a period of 120 minutes. The organism appears to have many of the characteristics of the genus *Aerobacillus* but we have not been able to demonstrate the existence of spores, and the culture, though more resistant to heat than *Escherichia coli*, was not highly heat resistant, as it was killed in 10 minutes at 80° C. The organism does not grow very well on nutrient agar but very luxuriantly in the presence of carbohydrates and produces very small colonies with a metallic sheen on eosine-methylene-blue agar. It does not grow on the MacConkey agar medium or in the tryptose-lauryl-sulfate medium of Mallmann.

Characterization of lactose fermenting bacteria of sanitary significance, and adoption of methods for their detection so as to eliminate "pseudo-micro-aerogenic" coliforms, the spore-forming lactose fermenters, and such extremely resistant coli-like strains as those described above (which probably are not members of the true coliform group but more likely asporogenous aerobacilli) should materially facilitate water analysis. The introduction of precautionary measures for assuring a rapid rise of the presumptive test medium to 37° C. as suggested by Stuart and the use of tryptose-lauryl-sulfate lactose broth (Mallmann) for the presumptive test are therefore worthy of careful and sympathetic consideration as procedures for expediting and simplifying the bacteriological examination of water.

SUMMARY

The importance is pointed out of temperature of incubation in the determination of characteristics of the coliform group of bacteria, and for the purpose of eliminating organisms of the group which are not of sanitary significance.

It is suggested that the methyl red test, because of the confusion introduced into the literature by failure to adhere strictly to the recommended temperature and incubation period stipulated for the determination, be dispensed with in favor of Voges-Proskauer reaction with which it is well correlated.

The technics recommended in *Standard Methods of Water Analysis*, 8th edition, are conducive to suppression of the number of positive Voges-Proskauer and negative methyl red tests, so that strains of *Aerobacter* tend to be allocated to the *Escherichia* or "intermediate" sections.

The *a*-naphthol reagent for detection of acetylmethylcarbinol (Voges-Proskauer test) is much more delicate than the Standard Methods potassium hydroxide reagent, and the lower temperatures of incubation (30° C.) yielded a greater number of positive Voges-Proskauer tests.

The production of indol is an important differential reaction.

A limited number of observations employing standard lactose broth and the tryptose-lauryl-sulfate lactose broth in parallel confirmed the value of the latter medium as a presumptive test for the coliform group of bacteria and for the suppression of spore-forming aerogenic bacteria. This medium did not, however, eliminate the slow lactose fermenters.

The possibility of eliminating spurious presumptive tests due to "pseudo-

micro-aerogenic coliform bacteria" by quickly bringing the test medium to the desired temperature and the suppression of spore-forming lactose fermenters by the use of tryptose-lauryl-sulfate broth, appears very promising.

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Infant Mortality Rate Drops to 48

THE Census Bureau on March 7 announced a reduction of the infant mortality rate for 1939 to 48 deaths per thousand live births, compared with 51 the year before and 68 ten years ago. The deaths of infants under 1 year, exclusive of stillbirths, were 108,846 in 1939, as compared with 116,702 in 1938.

Pointing out that the present death total for infants was equal to the population of such cities as Canton, Ohio, and Tampa, Fla., the Census Bureau expressed the belief that the rate was susceptible to further drastic decreases as indicated by the achievements of certain states. If, for instance, there had prevailed over the entire United States the low rate of Oregon, there would have been almost 28,000 fewer infant deaths in 1939. If, on the other hand, the high rate of New Mexico had prevailed nationally it would have meant an increase of more than 138,000 infant deaths.

Fourteen states achieved an infant mortality rate less than 40, as follows: Oregon, Minnesota, Connecticut, Nebraska, Washington, Massachusetts, Illinois, New Jersey, Iowa, New York, Rhode Island, Kansas, Indiana and Utah.

The rate for white infants was 44.3 and Negro 73.2. The rate of 48 was less than half the rate of 101 recorded in 1918.

Comparison of Methods for Sampling Lead Fume*

LEWIS B. CASE

General Chemistry Department, Research Laboratories Division, General Motors Corporation, Detroit, Mich.

TWO forms of apparatus are in common use for collecting samples in tests involving lead fume. Impingers, both singly and in series, have been used extensively. The general use of electrostatic samplers for the purpose is relatively new, and a question arises as to what, if any, mathematical relation may exist between the two.

The matter has been the subject of previous tests. Littlefield, Feicht, and Schrenk [1] report 9 tests in which efficiencies (based on electrostatic results) of single large impingers ranged from 21 to 53 per cent, and the combined efficiencies of two impingers in series varied from 55 to 60 per cent. The concentrations involved in the tests, as shown by the electrostatic sampler, varied from approximately 5 to approximately 33 mg. per cu. m., or 50 to 330 per 10 cu. m.

Halley and Martin [2] report results using 4 impingers in series and indicating efficiencies varying from approximately 45 to approximately 85 per cent.

The portion of the present series of tests, which relates to concentrations of fume in the range covered by the various concepts of a permissible limit, indicates ratios that are low and variable. They are variable in a rather unpredictable manner and to a rather undesirable extent. Higher efficiencies are indicated in connection with the comparatively high concentrations.

It seems reasonable to assume that a ratio between an impinger test and an electrostatic test is principally a function of particle size. It is, therefore, appropriate to state that the results reported herein may apply only to the conditions involved in the tests and that fume formed at other temperatures, or in the presence of oxygen, or at other rates of ventilation, might produce other ratios.

One and five-tenths milligrams per 10 cu. m. is commonly, but not by any means universally, recognized as a reasonable limit for lead in the air of factories. Other limits of the same general order of magnitude have been suggested. The 1.5 mg. concept is based principally on investigations made by U. S. Public Health Service in plants manufacturing storage batteries.[3, 4, 5] The samples were collected in the Public Health Service investigation by means of impingers. It is important to remember, however, that the majority of the men examined were exposed to dust rather than to fume and that the impinger apparently is quite efficient in the collection of lead dust.[1]

A suggestion has been offered on various occasions to the effect that the respiratory organs are not efficient in the retention of lead fume, and, therefore, the impinger may be a better

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 9, 1940.

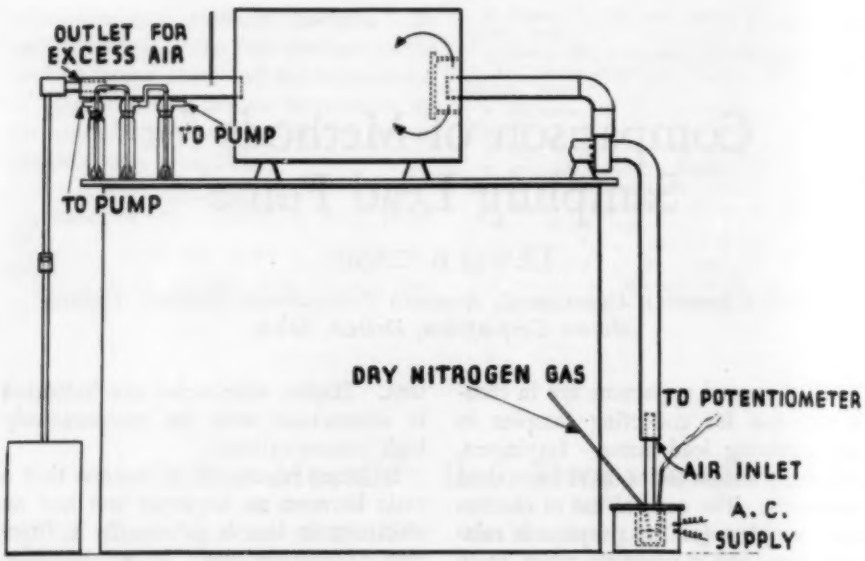

FIGURE 1.

measure of the actual exposure because it also is not very efficient. It seems prudent to assume a somewhat skeptical attitude toward this idea until it has received experimental support.

A diagram of the apparatus used in making the present series of tests is shown in Figure 1. Lead was heated in an atmosphere of nitrogen in the furnace shown in the lower right corner. The nitrogen, containing the fume, was then diluted with air. The mixture was passed through a blower, against a baffle in a settling chamber, and then into the outlet pipe. The samples were taken simultaneously from the outlet pipe, as shown. The speed of the blower was regulated to produce an excess of contaminated air. Commercial dry nitrogen was used without further purification. No substantial amount of dross was formed. In obtaining the lower concentrations, the nitrogen was conducted into the furnace. In obtaining the higher concentrations, the nitrogen was bubbled through the molten lead as a means of increasing the effective surface. The temperature of the lead varied from approximately 700 to 800° C.

Ten per cent by volume of reagent strength nitric acid was used in the impingers, which were the all-glass variety. The sampling rate was 1 cu. ft. per minute.

The amount of lead entrapped by the sampling apparatus was estimated by a method employing diphenylthiocarbazone and a photoelectric instrument.

Results of tests comparing impingers with the electrostatic sampler are shown in Table 1.

Table 2 shows comparative results obtained in a plant in which extensive soldering operations are performed. The distances between the sampling apparatus and the molten solder were about 18 in. in some of the tests, and perhaps 4 ft. in others. The time of sampling was approximately 30 minutes. It seems reasonable to assume that the concentrations of fume may have differed substantially within distances of a few inches. This in turn suggests that

TABLE 1

Test Number	Elec. Sampler	Impinger No. 1	Impinger No. 2	No. 1+No. 2	Ratio: No. 1+ No. 2 Elec.	Single Impinger	Ratio: Impinger Elec.
28	1.4	0.11	0.14	0.25	0.18	0.15	0.11
29	1.0	0.10	0.11	0.21	0.21	0.12	0.12
30	1.0	0.09	0.11	0.20	0.20	0.10	0.10
31	0.9	0.06	0.06	0.12	0.13	0.11	0.12
32	0.7	0.07	0.08	0.15	0.21	0.07	0.10
33	0.5	0.06	0.07	0.13	0.26	0.06	0.12
34	0.5	0.03	0.07	0.10	0.20	0.06	0.12
35	0.5	0.05	0.09	0.14	0.28	0.06	0.12
36	25.9	9.7	4.0	13.7	0.53	9.5	0.37
37	42.7	27.2	1.8	29.0	0.68	27.0	0.63
38	24.4	13.6	2.9	16.5	0.68	13.6	0.56
39	23.2	13.2	2.6	15.8	0.68	13.2	0.57
44	5.2	1.5	1.2	2.7	0.52	1.5	0.29
45	6.8	2.3	1.5	3.8	0.56	2.1	0.31
46	13.2	5.7	1.4	7.1	0.54	5.6	0.43
47	15.8	6.2	1.8	8.0	0.51	5.9	0.37

Milligrams of lead per 10 cubic meters of air

ample sampling time should be allowed in such circumstances.

TABLE 2

Test Number	Electrostatic Sampler	Single Impinger Water	Two Impingers in Series 10% Nitric Acid
5	3.1	1.2	2.5
6	2.3	1.3	2.3
7	1.3	1.2	0.9
8	0.7	0.8	0.5
10	2.2	2.9	2.3
11	1.4	2.2	1.4
12	0.3	0.8	...
13	0.2	0.8	...
14	2.6	2.9	...
15	2.1	0.6	...
21	2.0	0.6	...
24	0.3	0.6	...

Milligrams of lead per 10 cubic meters of air

A few experiments have been made with the asbestos filters known in laboratory parlance as Gooch crucibles. The asbestos pads were approximately 3/8 in. thick, and the rate of air flow was approximately 0.2 cu. ft. per minute. The lead was dissolved from the asbestos and determined by the dithizone procedure. The results are shown in Table 3.

The figures indicate that the filters compare quite favorably with the impingers. They have the disadvantage of a low sampling rate, which may not be too serious when samples representing long periods of time are desired. The use of filters is not, of course, recommended on the basis of these few tests, but apparently may merit further consideration in situations where electrostatic apparatus is not available.

There may be some uncertainty as to whether the electrostatic sampler retains all of the fume. Barnes [6] experimented with two electrostatic samplers in series. The first instrument, when operating at the recommended voltage, retained ap-

TABLE 3

Test Number	Electrostatic Sampler	Asbestos Filter	Ratio
48	14.6	9.6	0.66
49	12.5	10.3	0.83
50	8.3	5.9	0.71
51	3.0	2.7	0.90
52	3.1	2.6	0.85
53	3.8	3.4	0.90
54	0.51	0.36	0.70
55	0.38	0.28	0.74

Milligrams of lead per 10 cubic meters of air

proximately 99.5 per cent of the total lead collected. That phase of the problem, however, is beyond the scope of this paper.

In summary, we may state that the tests conducted under controlled conditions indicate that the efficiencies of impingers, as compared to the electrostatic sampler, are higher when dealing with relatively great concentrations than with relatively small. The experiments did not, however, disclose any ratio which is sufficiently definite to be very useful. The comparative tests made in the plant no doubt were further complicated by the lack of uniformity commonly encountered when testing close to the sources of contamination. Particle size also may have been a factor. The comparisons made with the asbestos filters indicate less inconsistency than was found with the impingers.

It appears that most, perhaps all, tests for small amounts of contaminants in air are beset with various complications and uncertainties. Quantitative estimations of lead fume appear similar to the others in that respect and need to be interpreted accordingly.

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Comparative Efficiency of Plating Media for the Isolation of Shigella Dysenteriae*

CATHERINE R. MAYFIELD AND MAUD GOBER

Division of Laboratories, Mississippi State Board of Health, Jackson, Miss.

IN a five year comparative study of the incidence of bacillary dystentery in the United States and possessions for the years 1933–1937, Joseph Felson [1] found a total of 79,042 cases. Since bacillary dysentery is not reportable in all of the states, this number of cases includes only the cases from the 21 states and possessions in which bacillary dysentery is reportable. Of these 79,042 cases reported, 45,172 were reported from the State of Mississippi. During the years 1937 through 1939, 28,755 cases were reported to the Bureau of Communicable Disease of Mississippi. The Division of Laboratories of Mississippi isolated 128 *Shigella dysenteriae* in 1937, 200 in 1938, and 246 in 1939. This increase in positive isolations may be due to a more demonstrable interest on the part of physicians in the state as well as improvement in laboratory methods for the isolation of *Shigella dysenteriae*.

During recent years much attention has been directed toward the development of a more efficient medium for the isolation of *Shigella dysenteriae*. Paulson [2] reported that desoxycholate and desoxycholate-citrate agars devised by Leifson [3] were superior to Endo and eosin-methylene-blue agars as plating media. Hardy [4] and Watt have confirmed these observations, particularly as they applied to the isolation of the Flexner varieties. Irons [5] and his associates found that desoxycholate-citrate was superior to MacConkey's agar for the isolation of organisms of the Flexner group, but concluded that it should be used in conjunction with a less restrictive medium in the quest for the other *Shigella dysenteriae*. Coleman [6] states that complete reliance cannot be placed on desoxycholate-citrate agar for the isolation of all types of *Shigella dysenteriae* and recommends the addition of at least one plating medium less restrictive.

The purpose of this paper is to report the comparative efficiency of plain Endo, lithium chloride Endo, desoxycholate-citrate, bismuth sulfite and Shigella Salmonella culture media for the isolation of *Shigella dysenteriae* from routine feces specimens received at the Laboratories of the Mississippi State Board of Health.

The laboratory findings from any specimen depend largely upon the collection of the specimen and its subsequent delivery to the laboratory. Feces specimens are collected in a screw-top, 1 oz. glass jar containing a 30 per cent

* Read before the Laboratory Section of the American Public Health Association at the Sixty-ninth Annual Meeting in Detroit, Mich., October 8, 1940.

glycerol solution (in 0.85 per cent salt solution), which has been autoclaved at 121° C. for 15 minutes. Instructions for inoculating the glycerine with a small amount of feces (not to exceed 1 gm., about the size of a bean) are given with each specimen container. Specimens must be forwarded to the laboratory in order to have them arrive not later than 48 hours after the time of collection. Specimens having an excessive amount of feces and those over 48 hours old from the time of collection until they reach the laboratory are reported as unsatisfactory and another specimen is requested.

Specimens are inoculated on the plating media used for isolation the day they are received, then placed in a 20° C. refrigerator and repeated platings made again on the second and third days. The plates are examined after 18 hours' incubation and suspicious colonies are fished to triple sugar tubes. Cultures giving characteristic reaction of *Shigella dysenteriae* on this medium are inoculated into tubes of semi-solid agar [7] containing the following carbohydrates: xylose, lactose, dulcitol, manitol, rhamnose, saccharose, and sorbitol. Tubes of Simons citrate [8] agar and Jordon and Harmons [9] sodium potassium tartrate agar are also inoculated from the triple sugar tubes. At the time of inoculating the carbohydrates, tartrate and citrate, a very small amount of the growth on the triple sugar slant is emulsified in Difco tryptone broth and restreaked on a plain Endo plate. A tube of Difco motility test medium [10] is also stabbed for the motility test. If the restreak on plain Endo shows that the culture is not pure, colonies are fished from this plate to triple sugar and again tested in the same manner. The tryptone broth culture after 24 hours' incubation is tested for indol production. The macroscopic slide agglutination is done with the anti-*Shigella dysenteriae* serum indicated by the cultural reactions. If a strain is isolated which gives the typical cultural reaction of a *Shigella dysenteriae* but which does not agglutinate with antiserum used, this culture is subcultured daily on a plain agar slant. Usually 6 to 8 transfers are sufficient to render the culture agglutinable. All non-motile cultures isolated which do not agglutinate with a known *Shigella dysenteriae* antiserum are stored for further study and a transfer of the culture sent to other laboratories for aid in identification.

All feces specimens are routinely plated on lithium chloride, desoxycholate-citrate and bismuth sulfite. Plain Endo is not used unless the examination for bacillary dysentery is requested or the specimen appears to contain mucus or blood. Previous findings [7] have shown that the additional

TABLE 1

Positive Shigella dysenteriae for Years 1937 through July, 1940
773 Positives

Type	*1937*	*1938*	*1939*	*Jan.–July, 1940*	*Total*
Flexner Group	108	138	186	140	572
Sonne	8	42	42	23	115
Shiga	4	1	5	7	17
Schmitz	4	5	3	1	13
Newcastle	4	11	4	16	35
Dispar	..	1	3	4	8
Unclassified (Positive Sorbitol)	..	2	3	8	13
Total	128	200	246	199	773

positive isolations obtained by the use of plain Endo do not warrant its inclusion. Table 1 is a tabulation of all positive *Shigella dysenteriae* isolated during the years 1937 through July of 1940.

It will be noted from Table 1 that Flexner is the predominating type isolated, with Sonne second, and Newcastle third. The *Shigella dysenteriae* classified in the "Flexner Group" are those called the positive manitol group by some classifications, namely Flexner, Hiss-Russell Y, Y-Hiss, Strong, and Mt. Desert. A polyvalent antiserum including several strains of Flexner and the above mentioned cultures is used for agglutination of this group. Monovalent sera are used for the identification of other *Shigella dysenteriae*. All antisera are made in this laboratory by the method recommended by Havens.[11] A number of the Sonne type isolated in 1937 were non-agglutinable when first isolated. An antiserum was prepared in 1938 from a transfer of Koser's Sonne obtained from the University of Chicago which has been a very satisfactory serum. Agglutination is generally obtained from the triple sugar tube, but occasionally a Sonne will have to be transferred a couple of times before agglutination is obtained. The Newcastle isolated in 1937 and 1938 were thought to be non-agglutinable varieties of Flexner not included in the anti-polyvalent serum being used. All of these strains agglutinated with the anti-

TABLE 2

Comparison of Desoxycholate-citrate, Plain Endo, Lithium Chloride Endo, and Bismuth Sulfite Agars for Isolation of Shigella dysenteriae from Feces

435 Positive Specimens

	Media Used for Isolation												
	Desoxycholate-citrate Repeated Plating			*Plain Endo Repeated Plating*			*Lithium Chloride Endo Repeated Plating*			*Bismuth Sulfite Repeated Plating*			
Type Dysenteriae													*Total Positives*
Hours →	*24*	*48*	*72*	*24*	*48*	*72*	*24*	*48*	*72*	*24*	*48*	*72*	
Flexner Group	219 (68)	67 (41)	18 (15)	100 (2)	44 (3)	8 (1)	35 (1)	22	10 (1)	6 (2)	..	..	314
Sonne	48 (15)	12 (6)	5 (3)	25 (2)	11	5 (2)	9	3	1	..	..	..	69
Shiga	10 (9)	3 (2)	1	3 (2)	2 (1)	..	..	..	..	..	..	..	17
Schmitz	2 (2)	1 (1)	..	1	..	..	2 (1)	..	..	1	..	..	4
Newcastle	12 (6)	4 (3)	3 (1)	3	2	2 (1)	2	1 (1)	..	2	..	..	21
Dispar	4 (1)	3	..	2	..	..	..	1	..	..	..	..	7
Unclassified (Pos. Sorbitol)	2 (2)	..	1 (1)	..	..	..	..	..	..	..	..	..	3
Total by Media			415 (175)			208 (14)			86 (4)			10 (2)	
Total Positives													435

Numbers in parentheses are specimens positive on this particular medium on this day only.

serum produced against Oxford strain of Newcastle and culture 6089–35 isolated in this laboratory in 1935. About 50 per cent of the Newcastle ferment dulcitol and not manitol. No culture with acid and gas in dulcitol has been isolated. It may be of interest to some that all of the Shiga have been isolated from feces specimens received through the mail. The type marked "positive sorbitol," type unclassified, seems to be a group of *Shigella dysenteriae* not included in any of the dysenteriae classified in Table 1. Sorbitol is the only carbohydrate fermented (from 3 to 8 days) of the ones used routinely. All strains isolated with these cultural reactions are agglutinated by an antiserum made from one of the cultures isolated from a patient having clinical symptoms of dysentery. There is no cross-agglutination between these cultures and the antisera of the Shiga and Newcastle.

The comparative study of plain Endo, lithium chloride Endo, desoxycholate-citrate, and bismuth sulfite agars includes 435 positive isolations of *Shigella dysenteriae*. These results are tabulated in Table 2.

The number of positive isolations from desoxycholate-citrate was 415 in comparison with 208 from plain Endo (using two plates), 86 from lithium chloride Endo, and 10 from bismuth sulfite. Very few isolations were made from the other media which were not made from desoxycholate-citrate medium. Of the 435 positives only 20 failed to be isolated from desoxycholate-citrate. If desoxycholate-citrate agar had not been used 175 of the 435 positives would have been reported negative. Eleven of the Shiga strains were positive on this medium only, while only 3 were positive on plain Endo which were negative on desoxycholate-citrate.

Attention is called to the number of positive isolations obtained on the second and third day's plating which were negative on the first day. This laboratory has been able to isolate from 20 to 30 per cent more positives both of *Shigella dysenteriae* and *Eberthella typhosa* by these additional platings. Plates picked one day have been held another 24 hours and examined again, but this method has not yielded any additional positives. Occasionally a first day's plate held and repicked after 24 hours proved to be positive; however, in each instance the second day's plating was positive.

Recently the Difco Laboratories have developed a new medium, Shigella Salmonella agar, which has proved very successful for the isolation of *Shigella dysenteriae* and other enteric organisms. This medium has been compared with desoxycholate-citrate agar and found to be an excellent medium. Since Shigella Salmonella agar has been used only a few months in this laboratory, the results obtained in the isolation of all enteric organisms have been recorded. The results of this comparison with 1,062 specimens are given in Table 3.

There were 379 positive isolations made from Shigella Salmonella agar and 356 from desoxycholate-citrate agar, in a series of 1,062 fecal specimens. Of the 379 positives from Shigella Salmonella agar, 48 were isolated from this medium only. Of the 356 positives from desoxycholate-citrate agar, 25 were isolated from this medium only. While only two Shiga strains were isolated during this comparison, they were positive on both media. From the results obtained in Table 3 Shigella Salmonella agar appears to be equally as efficient as desoxycholate-citrate agar. The differentiation between the fecal and pathogenic colonies is more defined on the Shigella Salmonella agar. The economy as well as the efficiency of Shigella Salmonella is an important item to be considered.

TABLE 3

Comparison of Desoxycholate-citrate and Shigella Salmonella Agars for Isolation of Enteric Organisms

1,062 Specimens

	Positive Cultures	Shigella Salmonella Repeated Plating			Desoxycholate-citrate Repeated Plating		
Hours →		*24*	*48*	*72*	*24*	*48*	*72*
Typhoid	101	84 (4)	12 (2)	4 (1)	86	8 (1)	..
Flexner Group	126	101 (6)	17 (5)	4 (1)	94 (1)	14 (1)	6 (2)
Shiga	2	2	..	..	2	..	..
Sonne	20	14 (2)	3 (1)	1 (1)	12 (1)	4 (1)	..
Newcastle	16	10 (3)	2 (1)	2	7	1	4 (2)
Dispar	3	2	..	..	3 (1)	..	..
Unclassified Positive Sorbitol	4	3	1 (1)	..	2	1	..
S. Alkalescens	4	4	..	..	4	..	..
S. Paratyphoid B.	2	2 (1)	..	..	1	..	..
Morgan's Bacillus	126	76 (10)	26 (4)	9 (5)	80 (11)	19 (1)	8 (3)
Total Positive by Media				379 (48)			356 (25)

Total Positive	404
Total Negative	658
Total Specimens	1,062

Numbers in parentheses are specimens positive on this particular medium on this day only.

SUMMARY AND CONCLUSION

The incidence of bacillary dysentery in Mississippi is very high if the number of cases reported to the Bureau of Communicable Diseases may be used as an index. During the years of 1937 through 1939, 28,755 cases were reported. The Division of Laboratories reported 128 positive isolations in 1937, 200 in 1938, and 246 in 1939. Improved laboratory methods as well as more manifest interest among the physicians and health officers of the state may account for the increase in the positive isolations as indicated in Table 1.

In a comparison of desoxycholate-citrate, plain Endo, lithium chloride Endo, and bismuth sulfite agars, 435 positive cultures of *Shigella dysenteriae* were isolated on one or more of the four media with 415 (95 per cent) positive on desoxycholate-citrate, 208 (48 per cent) positive on plain Endo, 86 (20 per cent) positive on lithium chloride Endo, and 10 positive on bismuth sulfite. The marked efficiency of desoxycholate-citrate for the isolation of *Shigella dysenteriae* of all types is shown in Table 2. Of 435 positive isolations, 175 were positive only on desoxycholate-citrate, compared with 14 from plain Endo, 4 from lithium chloride Endo, and 2 from bismuth sulfite agars.

A series of 1,062 fecal specimens has been compared on desoxycholate-citrate and Shigella Salmonella agars, the latter medium having been recently prepared by the Difco Laboratories. There were 404 positives enteric isolations made in this series, 379 from Shigella Salmonella and 356 from desoxycholate-citrate agar. The efficiency of Shigella Salmonella agar as compared with that of desoxycholate-citrate for the isolation of *Shigella dysenteriae* as well as other enteric organisms is shown in Table 3.

The additional positive isolations obtained by repeated plating of the fecal specimens the second and third days are shown in Tables 2 and 3. The positive isolations listed under 48 and 72 hours are positives which were negative on the 24 hour plates and would have been reported negative had only the one day's plating been made.

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IS THERE A DOCTOR IN THE BILL?

IN THE House of Representatives, on January 3, 1941, there was introduced by the late Mr. Pius L. Schwert, member of Congress from New York, a bill, H. R. 1074, which officially is designated as the "National Preparedness Act of 1941 for the improvement of physical and social fitness." The bill was referred to the Committee on Education.

The purpose of H. R. 1074 as set forth in the caption is "To promote the national preparedness and the national welfare through appropriation of funds to assist the several states and territories in making adequate provisions through schools for physical education, including athletics; instruction and guidance in healthful living; wider recreational use of school facilities; and the development of school camps." The bill calls for an appropriation of One Hundred Million Dollars ($100,000,000) in 1941, with Two Hundred Million Dollars ($200,000,000) for the fiscal year ending June 30, 1946, and for each year thereafter. One-half of the total amount would be utilized for school camps, the remainder for the other purposes set forth in the bill.

If the bill becomes a law, the U. S. Commissioner of Education, and the educational authorities of the several states, would administer it. Nationally, and in each state, there will be an advisory council, composed of members from "appropriate professions and agencies and other persons with special training in physical education, including athletics . . ."; and there would be "coöperation and, when necessary, to promote the objectives of this Act in accordance with the local pattern, working and financial agreements between state education agency or agencies and any other public agency or agencies administering these services related to the service furnished under the state plan, including public agencies concerned with welfare, health, conservation, recreation, camping and parks."

One's attitude toward such proposed legislation will, to some extent, be determined by his or her background, convictions and allegiances. The bill will undoubtedly be endorsed by many of those whose special interest is in the field of physical education; it is not likely to appeal to the majority of those engaged in the conventional activities of public health and medicine. Perhaps the former are overenthusiastic, the latter ultraconservative.

No one could argue against the desirability of robust youth instructed in and practising sound rules of hygiene. Further, the sharing of experiences, as in camps, the adjustments that are necessary in such circumstances, the development of ideals and a pride of membership in a group, be it camp or nation, which one respects—all these things raise morale and should give a new and fine vision of citizenship in the present, and maybe future, troubled times. And so, not only do we concede the importance of high morale in youth as a part of good mental hygiene, we emphasize its necessity as an element in national defense. Whether or not the school camps advocated in H. R. 1074 will reach this desirable goal must, of course, remain an open question: the answer will depend upon many and complex factors whose range of interplay is far wider than the limits of this editorial page.

We must, however, confess some doubts as to the wisdom of the parts of this bill which relate to the public health. We question seriously an approach which, except for health instruction, limits its service to the "prevention and correction of physical deficiencies" by programs of physical education. To spend this large amount of money in so narrow a field, and mainly for one age group, is far, far out of proportion to federal appropriations in state aid for all health purposes in the total population. We regret, too, any move to add confusion to a federal health administration which is already somewhat confounded; and we find it hard to believe that those who framed this legislation could, other than by intent, have so completely avoided any reference to utilization of two federal agencies already operating competently in the health field: The Children's Bureau, and the Public Health Service. Further, we find only an oblique reference to state health departments; and no, there is not a doctor in the bill.

All the above comments are editorial in nature. They may or may not be important. What is of definite significance, however, is the attitude of the Executive Board of the American Public Health Association in regard to the original Schwert Bill, which died with the last Congress. In part, the Executive Board, on December 20, 1940, expressed itself as follows: "If the time has come when a superstructure of health education can be supported through federal subsidy, we believe that it should be built on a sound medical program and corrective service as a first step. The administration of such services must not be divorced from the school medical program and the public health departments where experienced medical leadership is most readily available."

MINIMUM FUNCTIONS AND ORGANIZATION PRINCIPLES FOR HEALTH ACTIVITIES

IN 1933 the Committee on Administrative Practice of the American Public Health Association, at the request of the Executive Board, prepared a statement on the essentials of health organization; and now a new draft brought up to date will be found in the Association's *Year Book* for 1940.

On study of these two documents, one is impressed with the soundness of public health programs and their administration. As would be expected, the new draft expands that part of the statement which deals with minimum functions, using as a basis for broadening the scope of public health work the following definition: "A health problem becomes one of public concern when, because of its nature

and extent, its solution requires organized group action." The new document, too, sets forth more clearly than did the old the functions of local health departments, and emphasizes important administrative relationships between national, state, and local health services.

Revisions of the sort mentioned above indicate that the Association, in a realistic manner, is keeping step with current problems and opportunities for service. What is even more gratifying than this, however, is that with a fine consistency the same general principles thread through both documents. True principles do not become obsolete with the passage of time, and because the basic concepts of 1933 remained unimpaired after scrutiny in 1940, one is encouraged to believe that in public health we are indeed operating upon sound principles. Actually one can trace this heritage of consistency in the American Public Health Association much further back than 1933. For example, in the 1940 draft of organization principles we find the following: "The scope and policies of public health work at any given time will depend upon the stage of development of medical, sanitary, and related sciences, and upon the readiness of the public to support their effective use." Put this now against an 1873 statement of Elisha Harris, first Secretary of the American Public Health Association: "The permanent value and success of any methods or system of sanitary government will depend upon the degree in which the people are generally enlightened, concerned, and made responsible, in regard to sanitary duties." Though the two statements differ in rhythm and character of expression, the sense of the one is remarkably similar to that of the other.

In calling to the attention of readers of the *Journal* the document on Desirable Minimum Functions and Organization Principles for Health Activities, we do so because we are convinced that it is a valuable contribution and a sheet anchor in public health practice. We make this reference, too, with a more subtle and ulterior purpose, for we hope that those who read the document in the *Year Book* will be tempted to read other things in that publication. The *Year Book* does not receive nearly as much consideration and study as its importance justifies.

COCCIDIOIDOMYCOSIS

THE names of Rixford, Ophüls, Dickson, Gifford and Smith and their associates are inseparably associated with the development of our knowledge of what first was described in North America as "coccidioidal granuloma." The California workers have, to a great extent, had a monopoly on the study of this disease, largely due to the location in that state of the chief focus of infection in North America, the San Joaquin Valley. In recent years a few cases have been reported in Arizona, New Mexico, and Texas; hence in endeavoring to trace the origin of a case of infection with *Coccidioides immitis* it no longer suffices to inquire whether the patient ever has lived in the San Joaquin Valley. To the talent and the persistence of the workers mentioned above we are indebted for what seems to be relatively complete knowledge of several features of the infection.

What at first was considered a highly fatal, comparatively rare disease, of exceedingly limited geographical distribution, has, thanks to the work of recent years, been recognized as often a relatively trivial condition, far different clinically from the original type and of more widespread geographic distribution.

In the light of recent work, the fungus appears to cause a relatively benign respiratory infection, a bronchitis, or even a mild pneumonia, especially common among newcomers in the endemic area. One of the most remarkable manifestations of this type of the disease is the fact that many patients develop erythema nodosum. Indeed this characteristic combination of bronchial or pulmonary symptom complex and the subsequent cutaneous condition, always ending in recovery, was long known as "valley fever."

A very striking manifestation of the fungus infection, especially in the form known as coccidioidal granuloma, is the similarity, in the course, and gross and microscopic pathology to tuberculosis. Indeed, some pathological material filed away under the diagnosis of tuberculosis, upon restudy has been shown to present lesions due to *Coccidioides immitis*. Of great assistance in clinical studies is the skin test with coccidioidin, which appears to offer a high degree of sensitivity and specificity. The result of this test together with sputum examination, x-ray findings, and the clinical manifestations appear to make the diagnosis relatively easy, provided the condition is suspected. Not the least interesting feature of the disease is the fact that there have been a number of accidental infections among research workers due to the handling of cultures. Thus as a laboratory hazard the condition appears to align itself with tularemia and undulant fever, though with less serious results than with these. The California investigators believe that these and, indeed, infections under natural conditions, are due to inhalation of the dried spores.

Another feature of coccidioidomycosis is the existence of the disease in domestic animals, where the geographic distribution appears to be very similar to that of the infection in man.

A couple of years before the original California workers made their study, the description of the clinical condition had been made by investigators in South America. This later work nevertheless stands as an example of careful study and noteworthy achievement.

From the point of view of preventive medicine, but little is to be said. Prophylaxis against infectious diseases in general, with a few notable exceptions, becomes practicable only when we know the mode of spread of the organism, and when that may be controlled. If the present view that the causative organism of coccidioidomycosis is spread by the inhalation of dust is well founded, prevention in endemic areas practically is impossible. The one important fact in this field is that neither type of the disease spreads from person to person, or indeed so far as we know from the lower animals to man.

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Have you seen the Nomination Blank on page XXXIX?

Credit Lines

A Selective Digest of Diversified Health Interests

D. B. Armstrong, M.D., and John Lentz, M.S.

THIS THING CALLED JARGON

CALLING all Health Educators! If you failed to read the editorial entitled "The Jargon May Get Us If We Don't Watch Out" (in the February, 1941, issue of the *Journal*, page 183), turn to it at your earliest opportunity and study it carefully. Those who read it once might profit by a second reading, for the editorial sounds a warning note that health educators should heed.

As health education has gradually developed into a professional specialty, it has acquired a jargon of its own—a specialized vocabulary for use not only between professional workers, but one which tends to invade the material designed for public consumption. We were not aware, however, of the extent and growth of this jargon until we listened to a panel discussion recently in which a number of health educators expressed their views on a school health problem. The jargon flew thick and fast, and, like the writer of the *Journal's* editorial, we too felt that we must be behind the times, that we had failed to keep up with the newer developments.

A plea to health educators to watch this development would seem to be in order. Most of our work—spoken or written—is designed for people who use simple vocabularies. There are few ideas in health education that cannot be expressed in simple and clear English—or, as one observer has put it, "in small change language of the widest possible circulation."

Many authorities in various fields have frowned on the tendency of professional people to coin language that is meaningless to the uninitiated lay ear. Dr. William Nielson, ex-president of Smith College, has said: "I have a deep distaste for the esoteric vocabulary of self-conscious scholarship. Unnecessary hokus-pokus, I call it. The medical men have their lingo and now the sociologists are building up a terrible jargon, though I have yet to find in their books one idea which is not capable of being explained in standard English." *The New York Times*, commenting on the jargon coiners, remarked that it is always better to call a spade a spade than to call it an agricultural implement. And Winston Churchill, upon becoming Britain's Prime Minister, quickly ordered the Civil Service to replace its official jargon and pompous phraseology with simple language that would be easily understandable to the most uneducated person.

Mary P. Connolly, Director of the Health Education Division of the Detroit Department of Health, made a study some time ago of certain words and terms used by the department's employees in their work with the public. In this study, Miss Connolly undertook among other things to learn

Please address samples of printed matter, comments, or other editorial contributions to the editors at One Madison Avenue, New York, N. Y.

what the term "inciting agent" ("a sacred cow" to public health workers) meant to different groups served by the health department. The most interesting definition received came from a well informed woman who said the term "inciting agent" might be a Fuller brush man! Miss Connolly also learned from her study that mothers dislike such terms as prenatal and postnatal. It simplifies matters both for the health educator and the mothers to supplant these cold terms with such phrases as "before the baby comes" and "after the baby is born." It was also found that such terms as Schick test, Dick test, and tuberculin test, confuse parents. On the other hand, parents understood what the health educator meant when such terms as protective steps against diphtheria, scarlet fever, etc., were substituted.

Elma Rood has told of a health educator in Tennessee who undertook a sanitation project in a rural community. The health educator commenced his work by issuing instructions for the removal of all debris. He might just as well have addressed his public in a foreign language for debris was an unheard of word in the community. But results were obtained when families were requested to clean up their property. Miss Rood also tells of retaining the old term "consumption" when working with the rural groups, because tuberculosis has not yet come to mean one and the same thing to them. For the terms pneumothorax and phrenicectomy, Miss Rood substitutes "air treatment" and "nerve operation." She believes that her public thereby more nearly comprehends.

It appears, therefore, that we can get along quite well without an extensive health education jargon. Let's do away with as much of it as possible—or else we may be the very group that will bring about the "word-burden legislation" mentioned in the *Journal's* February editorial.

BEST SELLERS

Uncle Sam—the nation's Number One publisher — continued his gargantuan output of pamphlets, booklets, periodicals, and other printed materials during 1939. Surprisingly enough, certain publications dealing with health were Uncle Sam's "best sellers." *Venereal Disease Information* ranked as one of the government's most popular periodicals. Among individual publications *Infant Care,* which is in demand year

MAGAZINE ARTICLES

Current popular magazine articles on health or of medical import:

"Saving the Unborn." Gretta Palmer. *Ladies' Home Journal.* March, 1941.

"Your Child Can Be Immune." Philip M. Stimson, M.D. *Parents' Magazine.* February, 1941.

"Appendicitis." *Life Magazine.* February 24, 1941.

"Chicago Against Syphilis." Paul de Kruif. *The Readers' Digest.* March, 1941.

"What You Need to Know About Vitamins." *Look Magazine.* March 11, 1941.

"Rheumatic Fever." *Friday Magazine.* February 21, 1941.

"Surgery in Mental Cases." Marguerite Clark. *The American Mercury.* March, 1941.

"Total Defense and Public Health." James Rorty. *Harpers Magazine.* March, 1941.

"Million Dollar Sniffles." Doron Antrim. *American Magazine.* April, 1941.

(The above is not presented as a complete list and the articles cited are not necessarily recommended.)

in and year out, maintained its standing as the government's leading booklet. *Healthy, Happy Womanhood* and *You Can End This Sorrow* (a syphilis leaflet) ran up a total of nearly 600,000 copies each during 1939, while *Diets to Fit the Family Income* was not far behind.

Requests for health literature reach government agencies from all sections of the country, from all classes of society. It is rare indeed that the desired information cannot be supplied, but occasionally this does happen. For instance, no reply was sent to the following request: "Please send me photographs of vitamins, so I will know what to swallow and what to let alone."

EXHIBIT ENCYCLOPEDIA

At last there is available a book on exhibits that might be classed as a super-encyclopedia on the subject. This book, which we highly recommend, was recently published by the New York Museum of Science and Industry under the title "Exhibit Techniques." Health educators should place it on their "must" list of book purchases, for it will be an invaluable guide to those who are faced with the formulation of exhibit programs.

This book grew out of a survey conducted by the Museum staff during the 1939-1940 New York World's Fair. One hundred and thirty-six of the Fair's "most worth while" exhibits were studied. The resulting volume sets forth an exhaustive amount of data on all the technics and materials involved in exhibit construction and display. The proper utilization of space, light, plastics, water, murals, maps, puppets, panoramas, demonstrations, motion pictures, etc., are among the subjects dealt with. Line drawings of the exhibits discussed are also included and are most helpful.

The authors give an interesting definition of an exhibit and its purpose—to wit: "An exhibit is a short cut to knowledge that is designed 'to make friends and influence people.' It must draw attention, create and sustain interest, and tell a story."

"Exhibit Techniques" may be secured from the New York Museum of Science and Industry, Rockefeller Center, New York, N. Y., or the Association Book Service, at a cost of $2 per copy.

HEALTH IS NEWS

When health educators gather to "talk shop," there is one subject that generally comes up for discussion—namely, the attitude of newspaper editors toward material released for publication by health departments. Some editors welcome such press releases at any time, while others print them only when big stories are not breaking on the news front.

Conclusive proof that health information is newsworthy, even when stories of international importance may be crowding the press wires, was borne out recently by a leading New York City daily. By actual count there were eight articles on health and medical topics printed on the very day when Hitler's armies were on the move toward the Balkans. The lead story among the health items told of the work of New York City's district health centers. Other articles dealt with Sir Frederick Banting's discovery of insulin, the introduction of new forms of therapy in the New York Triboro Hospital for Tuberculosis, the correction of speech defects, the prevalence of measles, the introduction of short wave treatments for colds in England, and the dangers of rheumatic fever. Finally, a paragraph on public health was noted in an interview with the Duchess of Windsor who told of her interest in health conditions among the native population of the Bahamas!

If a great New York daily can devote several columns of space in a single

issue to health news, it should be relatively easy to induce editors in other localities to increase the coverage of health stories. Since it can be done—let's strive for more health news in the papers!

COPY COMMANDMENTS

Advertising and Selling, a trade journal, published in a recent issue an article by G. Lynn Sumner entitled "The Ten Commandments of Copy Writing." Since much of Mr. Sumner's advice can be applied to the preparation of health publications, we have revised his "commandments" somewhat in order that writers in the health field may follow them if they wish.

The "copy commandments," thus modified, follow:

1. Learn *all* about your subject before you write *anything* about it. Then material for your copy always will be a matter of selection, and in your copy, your knowledge always will be condensed—never inflated.
2. Organize your material. Get your information down in order, from the standpoint of the reader's interests—not yours.
3. Decide to whom you are writing. Remember, it is a person, not a circulation or a list. What you write will be read by one person at a time. You are writing a letter, not a speech.
4. When you are ready to write, keep it simple. That does not mean writing down to anybody. Simple language is easiest understood, longest remembered. Avoid high-flown phrases, "sweet wind."
5. Use meaningful words and phrases. If a picture is worth a thousand words, use words that create pictures in the reader's mind.
6. Don't try to be funny. To try and fail is tragic. Few people can write humorous copy and few health subjects lend themselves to it.
7. Make your copy specific.
8. Write to inspire confidence. If your reader doesn't believe you, nothing else matters.
9. Make your copy long enough to tell your story—and quit. No copy is too long if it holds the reader's interest. One sentence can be too long if it doesn't.
10. Finally, give your reader something to do and make it easy for him to do it. Tell him where to go for further information, or tell him how he can coöperate with the doctor and health officer. Outline how he can join in a community activity aiming at better health conditions.

LECTURES FOR LAYMEN

The New York Academy of Medicine has long and ably served the medical and allied professions as a fountainhead of knowledge. Its services have been rendered through many channels that have extended the Academy's influence far beyond the borders of its own community. In fact, the Academy has become an institution of international repute. Many health workers have drawn upon its resources and a number of significant public health movements have been instigated as a result of interest on the part of the Academy.

The public relations program of the Academy embraces many features of concern to health educators. Among these are its information service, which releases much health education material, and its series of lectures for laymen which are given each year by authorities in various fields.

One of the most absorbing, challenging, and learned of these lectures was delivered recently by Alan Gregg, M.D., Director of Medical Sciences of the Rockefeller Foundation, on "Humanism and Science." This address has now been published by Columbia University Press and should be read by health workers everywhere, for the philosophy which Dr. Gregg sets forth can be applied not only to the practice of medicine and to medical research, but to public health as well. Dr. Gregg's paper contains an eloquent plea for an alliance of medicine with humanism. He maintains that the resources which the humanists have made available in literature and the other arts constitute an invaluable supplement to the practice of medicine, inasmuch as humanism enables the doctor to understand his patients.

Dr. Gregg's paper should not be marred by clumsy comment on the part of a reviewer. Perhaps a few quotations taken at random from it will convey some idea of the excellence of Dr. Gregg's statement, both as to content and style of writing:

"Science, the fruit of man's preoccupation with nature, must give place to humanism, the flower of man's experience with man."

"Disease has many facets. Pain, disability, and death make up the most obvious among them. But disease has other aspects—uncertainty, for example, or fear and shame and the distress at letting down one's fellow men. Indeed, it is these human aspects of disease which are the hardest to bear, for which we physicians are most poorly prepared and in which scientific medicine has least to offer."

"Some patients would rather be understood than x-rayed, and rightly so."

"The scientist's lens to observe is bright: Let not his mirror to reveal go unpolished!"

"Mankind has always been stirred more by resurrection than by birth."

"The commonest error of the scientist is to assume that he is master of all the variables in his equation."

The Academy's annual series of lectures are published each year. The various volumes are well worth owning.

MISCELLANEOUS HEALTH NOTES

The Tuberculosis and Public Health Committee of the New York State Charities Aid Association reports two new mortality "lows" of standing interest for the up-state area in 1940. It will be remembered that the first statewide control programs in the fields of tuberculosis and diphtheria were initiated in this state. In 1940, the tuberculosis mortality rate reached a new minimum of 36.3 per 100,000, and the diphtheria death rate was 0.06. In this state also, the pneumonia control program had one of its earliest beginnings, and the mortality rate of 45.4 for the up-state area represented a minimum for this disease as well. At the same time, new cases of syphilis reported in 1940 were 12,786, as compared with 14,282 in 1939—continuing a downward trend in spite of all efforts to increase diagnosis and detection, and apparently reflecting a reduction in the spread of this infection.

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When we learned that Toronto, Ontario, had gone through the year 1940 without a single case of diphtheria, we assumed that this record would probably stand for a long time without sharp competition in Canada or the United States. However, we are now delighted to learn that America has a runner-up and a close competitor in the city of Newark, N. J. Health Commissioner Craster advises us that this city also went through 1940 with no cases or no deaths from diphtheria. While a little smaller than Toronto, it is certainly a top-notch accomplishment. Congratulations to Dr. Craster and his coworkers!

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The bearing of recently developed therapeutic procedures on pneumonia control seems to be clearly demonstrated by current experience in Canada and the United States in the matter of the recent influenza-pneumonia outbreak, as judged by the mortality records among the industrial policyholders of the Metropolitan Life Insurance Company.

In all of the United States, with the exception of the Pacific Coast area, while the influenza mortality increased in January, 1941, over January, 1940, from 15 to 19.8 per 100,000, the pneumonia mortality decreased from 54.7 to 53.8 per 100,000. In the Pacific Coast area the influenza contrast was more marked, rising from 10.4 to 27.9 per 100,000, whereas pneumonia showed only a slight increase—38.4 to 45.1.

In Canada, in the Province of

Ontario, where serum treatment and chemotherapy have been carried out probably as thoroughly as in the United States, while the influenza mortality in January, 1941, showed an increase, as compared with 1940, from 2.7 to 29.7, pneumonia decreased from 46.6 to 39.0. In Quebec Province, on the other hand, influenza increased from 26.1 to 50.1 and pneumonia from 50.3 to 105.8.

NOTES ON NOTABLE PUBLICATIONS

". . . but flu is tougher" is the catchy title of the first booklet to be issued in the Workers' Health Series. The Industrial Health Division of the U. S. Public Health Service is responsible for this publication and, if other booklets in the series are as cleverly done as this one, we shall have a succession of publications that "hit the bull's eye." ". . . but flu is tougher" is evidently the work of a new writer in the health field, since all the accepted patterns of health literature have been discarded for a fresh and original approach to the subject. The text tells of Chesty Bigbee, a modern Tarzan who, despite his ability to "take it," finally learned this moral: "Don't try to be tough with the flu, it is tougher than you."

The text is compact and informative and the illustrations can best be described by the overworked word "swell." The drawing on the cover, which shows Chesty clad only in his shorts and flexing his biceps, is certainly an eye catcher and a decided departure in illustrations for health literature.

This booklet will undoubtedly have a strong appeal for a masculine audience.

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An annual report of unusual distinction is that of the Staten Island Social Service, Staten Island, N. Y. Printed in black and white, illustrated with excellent photographs, this report towers above the usual run of annual statements that come from health and welfare agencies. It is the text, however, more than the format or photographs, that lends distinction to this publication. The writer employs a style reminiscent of Pare Lorentz, author of the memorable commentary for the film "The River." It is refreshing to come upon an annual report that says something in a different way. Upon reading this publication, one gets a lasting impression of Staten Island as a community, the character of its people, what problems they face, how they look, how they talk. Factual information about the organization is limited to the last two pages of the booklet. Congratulations are in order to Harald Lund, the author; Gay Dillon, the photographer; and to others who may have aided in the publication of this report.

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In line with the growing interest in nutrition, the Department of Health of the City of New York recently devoted an entire issue of its periodical *Neighborhood Health*, to a comprehensive review of food and its relation to all age groups. This is a decidedly praiseworthy effort and the publication should be an important contribution to popular nutrition education.

The physical appearance of this publication is very attractive. Two colors are skillfully used in the illustrations and in certain decorative panels and backgrounds. The varied illustrative material includes photographs, charts, drawings, and cartoons—all of considerable interest and merit.

Publications devoted to nutrition generally make rather discouraging reading, in the estimation of the layman. The editors of *Neighborhood Health*, however, have succeeded in pepping up the subject and giving it a timely and popular appeal. Agencies planning nutrition material will find this publication exceedingly helpful as a guide as to what to tell and how to tell the public about food in relation to health.

BOOKS AND REPORTS

Books of Special Interest to Public Health Workers

MAZÝCK P. RAVENEL, M.D.

"A good book is the best of friends, the same to-day and for ever."—MARTIN FARQUHAR TUPPER.

THE past year has been an interesting one. With so much of the world dislocated, fears were entertained for the output of books during the year. This has been better than expected, no doubt because a worth while book takes long to prepare and perhaps the great majority of those published and reviewed in 1940 were written during 1938 and 1939.

There has been perhaps an unusual number of shorter reports on various subjects, but there has been a good output also of worth while books.

In preparing this review the *American Journal of Public Health* has again been our main source of information. The other journals consulted have been chiefly the *Journal of the American Medical Association*, the *London Lancet*, and the *British Medical Journal*. Due probably to the arrangement that has been made by certain of our large American publishing houses with some in England, it is not unusual to find the same books reviewed in both English and American journals, and it is pleasant to note that the English, who apparently take book reviewing more seriously than many Americans do, have in a number of cases given more favorable reviews of American books than have the Americans.

As in former reviews, the comments on the books are taken from the published reviews. The substance has in no case been changed, though quotation marks have generally been omitted.

BIOGRAPHY AND HISTORY

There have been a number of delightful books on biography and history, two or three of which are unusual not only in their character, but in their permanent value. *Carlos Finlay and Yellow Fever*, by Carlos E. Finlay, Oxford University Press, is an excellent work containing translations from the Spanish of many of Finlay's studies on yellow fever, by his son. It is well illustrated and gives to the public for the first time in English much material which it should have had many years ago. The book is an important one and holds one's interest throughout. It gives also the family history of Carlos Finlay. *The Development of Public Health in Canada*, edited by R. D. Defries, Canadian Public Health Association, is a most useful and interesting book, well planned, and well done. It is a foundation stone in the history of public health on the American continent. *History of the London County Council, 1889–1939*, by Sir Gwilym Gibbon and Reginald W. Bell, Macmillan, is a remarkable book—a storehouse of information for the student of history, public health, and social science wherever he may reside. It gives in an interesting and enlightening manner the organization, relationships, services, and significant achievements of a great organization which has exercised an important influence on the lives of the people of London, and

stimulated the development of constructive governmental activities elsewhere. *The Kosher Code of the Orthodox Jew,* by S. I. Levin and Edward A. Boyden, The University of Minnesota Press, is an unusual book, being the first time that the Laws of Terefah have been translated into English. One author is Professor of Anatomy of the University of Minnesota, and the other the Senior Orthodox Rabbi of Minneapolis. The book explains the customs of the Jews in regard to animal foods and also shows the contributions made by the Jewish inspectors to the gross anatomy of food animals. It is recommended for all libraries, and Rabbi Levin says it should be in the library of theological schools. It is an authentic guide for observers of the orthodox law. *A Mirror for Surgeons,* by Sir D'Arcy Power, Little Brown, is delightful, containing sketches of 22 great surgeons who have contributed to the advancement of surgery. *Panum on Measles:* Observations Made During the Epidemic of Measles on the Faroe Islands in the Year 1846, by Peter Ludwig Panum, American Public Health Association, is a classic made available in English by the Delta Omega Society to which we all owe a debt of gratitude. The observations of this modest Danish physician constitute a model of epidemiological study and recording. An indispensable book. *American Doctors of Destiny,* by Frank J. Jirka, Normandie House, contains a number of interesting personal sketches of doctors from the beginning of America as a country throughout the colonial period, with 21 portraits. Combined with the sketches of the doctors there is necessarily a good deal of medical philosophy as well as history. *Faiths That Healed,* by Ralph H. Major, Appleton-Century, is an interesting account of the various faiths and superstititions which have influenced, and still do influence, many sincere people as well as multitudes of the ignorant. The author has made original studies concerning many of these and writes of them in a most interesting manner. The book is designed for the laity but can be recommended to the profession as well. *The Medical Career and Other Papers,* by Harvey Cushing, Little, Brown, is a collection of addresses and sketches published posthumously. All of them are interesting. The book is readable and a notable addition to the medical history of our times. *A History of Tropical Medicine,* by H. Harold Scott and H. Camb, Williams & Wilkins, has been prepared by the Director of the Bureau of Hygiene and Tropical Diseases of the London School of Hygiene and Tropical Medicine, who is well fitted to write such a history, and has made a valuable contribution to medical history. It should be widely used as a reference by individuals and libraries.

CHEMOTHERAPY AND SERUM THERAPY

Few more sensational discoveries have been made for many years than that of the chemical treatment of pneumonia. The discovery of prontosil was sensational, and valuable not only in itself but has led to the development of a number of new products which have practically revolutionized the treatment of various infections. We do not in our *Journal* go into treatment except where the therapy depends on bacteriological products, such as antitoxin, or where there is direct chemical action on the pathogenic organisms. The new substances for the treatment of infections have appeared with startling rapidity, and it seems wise to mention the books which have been published concerning these developments. Among these are: *Chemotherapy and Serum Therapy of Pnuemonia,* by Frederick T. Lord, Elliott S. Robinson, and Roderick Heffron, Commonwealth Fund. The tremendous advance in the

treatment of pneumonia due to the new chemical substances discovered and built up makes it necessary to mention this excellent book, which gives the result of ten years of study. The authors have made many fundamental contributions to the subject. They condense in a remarkable way the maze of scientific advances and give a concise, up-to-date summary of our knowledge of the pneumococcus, the diagnosis of pneumonia, and the various forms of therapy. *Pneumonia: With Special Reference to Pneumococcus Lobar Pneumonia,* by Roderick Heffron, Commonwealth Fund, completes the trilogy which has come from the Massachusetts Pneumonia Study and Service. It is an exhaustive study of 1,086 pages, which should be in every medical library. Another book which appeared in 1939 but was not reviewed until 1940, and which is constantly referred to by writers on the subject is *The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds,* by Perrin H. Long and Eleanor A. Bliss, Macmillan. It is a fundamental contribution.

CHILD HYGIENE AND TRAINING

Child training and hygiene has not given us a great many books in 1940, though there have been a number of reports and short articles. *Child Training and Parent Education: References to Material in Recent Books,* by Lucile Reiner Stebbing and Caroline Shurtleff Hughes (2nd ed.), H. W. Wilson Co., contains a list of books which have been published within the last 15 years, and most of them within the last 10 years. The material has been well chosen and is of great practical value. *The First Five Years of Life—The Preschool Years,* by Arnold Gesell, Henry M. Halverson, Frances L. Ilg, Helen Thompson, Burton M. Castner, Louise B. Ames, and Catherine S. Amatruda, Harper, cannot be too highly recommended. There is no other book that gives a more complete picture of normal growth and development in so compact a form. *Psychiatric Clinics for Children: With Special Reference to State Programs,* by Helen Leland Witmer, Commonwealth Fund, is well conceived and exceedingly well written, very helpful to all who are struggling to bring body, mind, and soul together in a topsy-turvy world. The times which we are going through make this study of especial value.

ENGINEERING

Many papers and reports have appeared, but few books have been sent in to us for review. Among these are: *Swimming Pool Standards,* by Frederick W. Luehring, Barnes, which is the history of swimming pools from ancient times to modern, after which there is a discussion of modern rules and regulations, ending with a list of 20 criteria for judging the standards. *Public Works Engineers' Yearbook 1940,* American Public Works Association, is recommended especially for governmental administrators, research bureaus, and libraries. The 1940 issue of this most important publication contains 338 pages. Attention is focused on both administrative and technical aspects of the subject.

HEALTH EDUCATION

Health education has been very much to the fore for several years. Many articles and some books have appeared. Among the best of these are: *Your Health Dramatized: Selected Radio Scripts,* by W. W. Bauer and Leslie Edgley, Dutton. Educators and health officers who are unfamiliar with radio production of professional quality can obtain from the script exchange of the United States Office of Education full lists of available scripts useful for health education. *Ways to Community Health Education,* by Ira V. Hiscock,

the Commonwealth Fund, is a coöperative project by five experienced persons. It lays stress on the importance of community organization for health education. It marks another step forward in a relatively new professional field. *School Health Problems,* by Laurence B. Chenoweth and Theodore K. Selkirk, Crofts, is a carefully prepared text, which, with its useful appendices and valuable reading lists, will be found valuable to teachers as well as to all engaged in public health work. *Good Health and Bad Medicine,* by Harold Aaron, McBride, deals with everyday medical ailments in which the temptations to self-medication are strong. The advice given is simple, practical, and in accord with accepted medical opinion. The information given is derived from standard government reports and official councils of the American Medical Association and the American Dental Association as well as the Agricultural Experiment Stations. It is written for the laity and is especially recommended for the home and for those engaged in the health education of school children and the public. *Non-Profit Hospital Service Plans,* by C. Rufus Rorem, American Hospital Association, contains a great deal of value to those interested in the subject of hospital service plans. It is recommended to hospital executives and trustees, members of social agencies, and others in the community who are interested in the economic aspects of hospital and medical care.

HOUSING

For several years housing has attracted more and more attention in other countries as well as America. *Introduction to Housing: Facts and Principles,* by Edith Elmer Wood, Washington: Superintendent of Documents, is the most valuable single reference work in the housing literature of the past five years. If there is any such thing as a one volume library on housing, this book of 140 pages is it.

The housing problem is an acute one in this country and is rapidly being made much more so in many areas by the defense movement. A number of authoritative pamphlets and several books have appeared during the year which can be recommended along this line, and information concerning which can be obtained from the office of the American Public Health Association: *Can America Build Houses?* by Miles L. Colean; *The Homes the Public Builds,* by Edith Elmer Wood and Elizabeth Ogg; *New Homes for Old: Public Housing in Europe and America,* by William V. Reed and Elizabeth Ogg; *Homes: Front Line of Defense for American Life,* Survey Graphic; *Housing the Masses,* by Carol Aronovici; and *Housing for the Machine Age,* by Clarence Arthur Perry.

INDUSTRIAL HYGIENE

The recognition of the importance of industrial medicine and hygiene has been rapidly gaining in public health work for several years. The tremendous development of new chemical products of various kinds in industry has brought with it problems of public health and exposure. The efforts at preparedness now going on in our country have brought the whole question acutely to the front. The engineers are keeping up with the demand largely through papers, and there has not yet been time for the writing of many standard books on new developments. However, the interest in the general subject is shown by quite a list of books on various aspects of indusrial health. *Medicolegal Phases of Occupational Diseases,* by C. O. Sappington, Industrial Health Book Company, is a valuable contribution on the subject, especially for physicians and public health officials. *Industrial Health—Asset or Liability,* by C. O. Sappington, Industrial Commentaries, is a balance sheet of the pros and cons

of industrial health, ending with the conclusion that industrial health work has paid and will continue to pay dividends upon whatever basis one may choose to calculate them—but the most important of these are human dividends. *Third Annual Symposium, Department of Industrial Medicine*—Northwestern University Medical School, Northwestern University, is a well conceived and virile contribution from one of the most extensive industrial centers in the world. *Fourth Saranac Laboratory Symposium on Silicosis*, edited by B. E. Kuechle, Employers' Mutual Liability Insurance Co., is an indispensable work in its field from which we gain the impression that this subject is gradually coming under control, with more of facts and less of theory. *Industrial Hygiene*, edited by A. J. Lanza and Jacob A. Goldberg, Oxford University Press, was written with the needs and viewpoints of the industrial physician in mind, and includes important ancillary features such as special therapy, nursing, compensation, health education, and is authoritative.

LABORATORY

The Laboratory Section of our Association has for years been among the one or two largest. There has been no cessation of activity on the part of laboratory men, but there has not been the output of laboratory texts that might have been expected. The following are worthy of especial mention: *Biological Products*, by Louis Gershenfeld, Romaine Pierson Publishers, a comprehensive discussion of biologicals, their production and standardization, well done, useful to teachers as well as students; and *Industrial Microbiology*, by Samuel Cate Prescott and Cecil Gordon Dunn, McGraw-Hill. This is an important new work which treats of the utilization of yeasts, bacteria, and molds for the production of industrially important or potentially valuable products. The recent advances in the fermentation industries and research are discussed. Of particular interest are the multitude of poisonous substances generated by fermentation. The book is of especial interest not only to the technical groups for whom it is written, but for laboratory workers in general and physicians in industrial centers where these fermentation processes engage workers in industrial or commercial procedures.

MENTAL HEALTH

Conditions in what appears to be a mentally sick world emphasize the importance of mental health and hygiene so long regarded by most of us as a specialty too difficult for the ordinary person to understand or even tackle. There have been a number of attempts to make the subject attractive and understandable to the average person, which have succeeded to a greater or less extent. Notable among the books of the year are: *Social and Biological Aspects of Mental Disease*, by Benjamin Malzberg, State Hospital Press, which shows much painstaking effort in production. It is recommended as a necessary text to all who would presume a responsible participation and knowledge in the field of mental health. *Beyond the Clinical Frontiers: A Psychiatrist Views Crowd Behavior*, by Edward A. Strecker, Norton, is one of The Salmon Lectures of the New York Academy of Medicine, and needs to be read and studied by many classes of society. It is not easy reading, not to while away an idle moment, but to gain some idea of what Mental Hygiene is doing to make this disturbed old world better to live in. *The Troubled Mind: A Study of Nervous and Mental Illnesses*, by C. S. Bluemel, Williams & Wilkins, is a worth while addition to the meager supply of nontechnical books much needed to enlighten the public in regard to the meaning and significance of one

of the major problems of medicine and public health. *A Handbook of Elementary Psychobiology and Psychiatry,* by Edward G. Billings, Macmillan, is intended primarily for the general medical practitioner and the medical student, but of value also to the specialist in mental and nervous diseases. It is an expertly prepared compendium of hard-won knowledge made comparatively easy for the busy practitioner, and is "worth its weight in therapeutic gold."

NURSING

Nursing, and especially public health nursing, continues to excite great interest everywhere, and properly so. Present conditions in our country will put unusual demands on the nursing profession. There is one book which we believe will be of especial interest in the emergency conditions which may develop: *Improvised Equipment in the Home Care of the Sick,* by Lyla M. Olson (3rd ed.), Saunders. It contains 419 illustrations of equipment with accurate directions for constructing and use. It is a practical and useful book, highly recommended. *Nursing in Sickness and in Health: The Social Aspects of Nursing,* by Harriet Frost, Macmillan, is an exceptionally helpful and timely book and all those interested in nursing education are debtors to the author. *Supervision in Public Health Nursing,* by Violet H. Hodgson, Commonwealth Fund, is by a public health nurse, eminently fitted by the variety and type of her experience to be a real authority, and the author has produced a most significant book on public health nursing which can be highly recommended from every standpoint. *Manual of Public Health Nursing* (3rd ed.), prepared by The National Organization for Public Health Nursing, Macmillan, is highly recommended for nurses working alone as well as for the staffs of public or private agencies. Whatever type of service a nurse may be engaged in, assistance in solving problems will be found in the "New Manual."

NUTRITION

Nutrition studies have been worldwide, and the shadow of war which hangs over us has caused great activity along these lines. Among the books which have come to our attention are: *Food Control: Its Public Health Aspects,* by James Houston Shrader, Wiley, an excellent manual for the use of regulatory officers, food technologists, and students of the food industry, by one who has had extensive experience. It should be in the library of every regulatory official and every purveyor of food. *Milk and Nutrition—New Experiments Reported to the Milk Nutrition Committee, Part IV,* National Institute of Research in Dairying, 1939, contains excellent studies emphasizing the great value of milk for growth and health, showing also that raw and pasteurized milk have practically the same nutritive value for growing school children. *Vitamin D—Chemistry, Physiology, Pharmacology, Pathology, Experimental and Clinical Investigations,* by C. I. Reed, H. C. Struck, and I. E. Steck, University of Chicago Press, is a book of 389 pages on this vitamin which shows the importance in which it is held by students of nutrition. From every standpoint this is an authoritative, well written book, by authors known for their original researches in this field. In spite of the new material on vitamins being brought forward constantly, this book will hold the spotlight of public attention and scientific inquiry for many years. The American Medical Association has been publishing serially articles on the vitamins which are now collected and published in book form: *The Vitamins: A Symposium Arranged Under the Auspices of the Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association,* a volume

of 637 pages, brings the vitamin question up to date and gives additional evidence of the recognized importance of this group of substances by those interested in nutrition. The book is a must one for libraries and has a place on the shelves of private individuals interested in nutrition. During the World War the slogan was "Food will win the war." It has been said that in case of another war the slogan will be changed to "Vitamins will win the war." Certainly the present conditions brought about by preparedness which closely simulate war are making these subjects of immediate practical importance. *The Nation's Larder—Lectures at Royal Institution,* London, G. Bell and Sons, discusses food from historical, medical, agricultural, manufacturing, housewifery, and pediatric points of view. The more this book is studied the better.

ORAL HYGIENE

Oral hygiene is another more or less new branch from the public health standpoint. It will be remembered that we now have an oral group in our Association, showing the interest which is being taken in this important subject. During the past year a number of books have appeared which well deserve our attention: *A Survey of Mouth Hygiene Programs for School Children, Section V,* Cleveland Child Health Association, is the last volume of a most interesting study made under the direction of Dr. H. R. C. Wilson, of the Cleveland Child Health Association, covering respectively 13 cities of more than 500,000 population; 38 cities of 150,000 to 500,000; 42 cities of 100,000 to 150,000; and 98 cities of 50,000 to 100,000. It is a well done piece of work of great interest, especially from the standpoint of mouth hygiene but also of general health. *Radio Manual—A Compilation of Radio Broadcasts for Mouth Health Education,* Oral Hygiene Committee of Greater New York, represents the thoughts and presentations of prominent dentists and health workers of New York, and is a significant addition to the field of public health education. *Dental Health Organizations in State Departments of Health of the United States,* U. S. Government Printing Office, does not attempt to compare the dental health programs of the various states, but gives an enormous amount of useful information of factual value. It is recommended as a guide and aid to those about to inaugurate such services. *Public Health Dentistry and Health Security. A text-workbook for students and practitioners,* by Alfred J. Asgis, Clinical Press, is prepared to give students of public health dentistry a conception of the aims and activities of dentistry and public health. There is need for the establishment of dental public health on a firm basis in every state and city health department, and this book is a practical outline which will prove useful to both teachers and students. *Teeth, Health and Appearance,* by Lon W. Morrey, Bureau of Public Relations, American Dental Association, is mentioned as showing the growing interests in oral hygiene. It has been approved by the American Dental Association and the U. S. Public Health Service. It is principally for lay reading and can be thoroughly recommended.

PUBLIC HEALTH

Under the heading of public health may be mentioned: *The Building of a Nation's Health,* by Sir George Newman, Macmillan. This is an unusual book by an unusual author, describing what was accomplished by the combination of statecraft and medical knowledge taking counsel together. It gives sketches of men like Edwin Chadwick, Sir John Simon, and William Farr, and the influence their work has had on public health of today. It is a valuable

contribution by an outstanding public health statesman which should be available to every student of public health. *Epidemic Encephalitis: Etiology, Epidemiology, Treatment,* Third Report by the Matheson Commission, Columbia University Press, is more than a mere review of published material on the ever broadening subject of encephalitis, but a comprehensive treatment of the sequence of discoveries in the field and in the laboratory, tied in with an impartial evaluation of clinical applications of such discoveries. *Health for New York City's Millions: An account of activities of the Department of Health of the City of New York for 1938*—with comparative vital statistics tables, by John L. Rice, New York Department of Health, is mentioned, since the health administration of New York City and New York State has for years had a marked influence on that of smaller cities and communities. Under Hermann M. Biggs, the City Department of Health led the world and successive officers of health have striven to rival his work—often with marked success. The book contains a lot of factual and statistical material as well as much interesting and valuable reading. *Brucellosis in Man and Animals,* by I. Forest Huddleson, A. V. Hardy, J. E. Debono, and Ward Giltner, Commonwealth Fund, is a necessary book for every library. The increasing recognition of the importance of undulant fever not only in this country but in various parts of the world makes this a most important contribution. It contains chapters on the distribution of the disease in the United States by Hardy, and in Malta by Debono, and one on control in the United States by Ward Giltner. *Virus and Rickettsial Diseases, with Especial Consideration of Their Public Health Significance,* by various authors, Harvard University Press, is the outgrowth of a symposium held at Harvard in 1939. It is up-to-date and authoritative. For each subject discussed liberal lists of references are given. The book is indispensable to specialists in the field covered and of value to all interested in the infectious diseases. *Health is Wealth,* by Paul de Kruif, Harcourt, Brace, is a virile and entertaining book filled with food for thought, though the style of the author is rather exuberant.

TEXTBOOKS

Medical Microbiology, by Kenneth L. Burdon, Macmillan, is the outgrowth of another book by the same author intended primarily for nurses, and there is still evidence of the emphasis on the rôle of the nurse in the care of the sick and prevention of illness. It is a valuable textbook for teachers and students of bacteriology, especially when the subject is considered from the point of view of human pathology. *The Dysenteric Disorders — The Diagnosis and Treatment of Dysentery, Sprue, Colitis and Other Diarrheas in General Practice,* by Philip Manson-Bahr, Williams & Wilkins, although going into treatment, is included here since it treats of a major problem in practice, which is likely to be met with in this country in the near future. Diagnosis, which is difficult, is aided by an appendix on laboratory methods. The book should be available in libraries. Another book to be especially recommended is *Veterinary Bacteriology,* by I. A. Merchant, the Iowa State College Press, which treats primarily of the microörganisms causing animal diseases, but since so many diseases of animals can be transmitted to man, has great value from the public health standpoint.

VENEREAL DISEASES

The year has shown great activity in the study of venereal diseases, largely owing to the campaign inaugurated by our Public Health Service. Two useful books have appeared which can be

recommended: *Gonorrhea in the Male and Female,* by P. S. Pelouze, Saunders, is a book written in attractive style and copiously illustrated. It is an essential book for all who deal with infection either from the medical or public health standpoint. *Digest of Laws and Regulations Relating to the Prevention and Control of Syphilis and Gonorrhea in the Forty-eight States and the District of Columbia,* compiled under the direction of Bascom Johnson, American Social Hygiene Association, is a valuable compilation which should be available in all libraries.

NEW EDITIONS

The year has brought many new editions of successful books, and are here grouped. *Bacterial Metabolism,* by Marjory Stephenson (2nd ed.), Longmans Green, is a discussion of a complex subject which is attracting much attention—a well done piece of work, which is highly recommended. *Handbook of Bacteriology: For Students and Practitioners of Medicine,* by Joseph W. Bigger (5th ed.), Williams & Wilkins, is perhaps the most widely used textbook on the subject in England and Canada, and has been highly recommended in this country. Each edition has been better than the one before. *Handbook of Public Health Bacteriology and Chemistry:* General information regarding epidemiology, collection and shipment of specimens, and bacteriologic, serologic, and chemical procedures, Department of Public Health of San Francisco (2nd ed.), J. W. Stacey, Inc., is a most valuable textbook and can be recommended without hesitation. *The Sanitary Inspector's Handbook,* by Henry H. Clay (4th ed.), H. K. Lewis & Co., Ltd., is a most useful book of its type, which has proved it worth, each edition being acclaimed, especially in England, which is its home. It is recommended unreservedly as a practical guide and reference for officials and as a manual for students. *Nutrition and Diet in Health and Disease,* by James S. McLester (3rd ed.), Saunders, is useful for physicians, public health officers, and all who are interested in nutrition as a potent factor in health. *Nutrition and Physical Fitness,* by L. Jean Bogert (3rd ed.), Saunders, covers a wide field and can be read profitably by anyone who wishes to know something of nutrition and its relation to health. *Stedman's Practical Medical Dictionary,* by Thomas Lathrop Stedman and Stanley Thomas Garber (14th ed.), Williams & Wilkins, can be recommended without reservation, not only for those who are trying to improve their medical vocabulary but also for editors, publishers, proof readers, abstracters, and all who have to do with medical literature. *The Care and Handling of Milk,* by Harold E. Ross (2nd ed.), Orange-Judd, has retained the same ideals as the first edition, is sound and authentic. It deserves a place in the libraries of all who are interested in dairying. *The Science of Psychology,* by Raymond H. Wheeler (2nd ed.), Crowell, has appeared. It would be perhaps too much to expect psychologists to agree with each other to a great extent, but the reviewer says that this work " represents on the whole, a somewhat more desirable trend in psychology from the point of view of organization, as well as from the point of view of its greater emphasis upon the reaction of the organism in its total personality setting." *A College Textbook of Hygiene,* by Dean Franklin Smiley and Adrian Gordon Gould (3rd ed.), Macmillan, is a useful book brought up to date, with new and effective illustrations, a glossary, and selected bibliography. *Textbook of Public Health,* by W. M. Frazer and C. O. Stallybrass (10th ed.), Williams & Wilkins, has been brought up to date but appears for the first time under its present authorship, having been previ-

ously known as Hope and Stallybrass. While it is written from the English standpoint it can be recommended for all students of public health in any country.

MISCELLANEOUS

202 Common Household Pests of North America, by Hugh Hartnack, Hartnack Publishing Co., is written especially for members of the pest control industry, but is of great value to the health officer and householder, especially in view of our increasing knowledge of the agency of insects in carrying disease. *Medical Climatology,* by Clarence A. Mills, Thomas, is of interest to students of the ecology of disease. The author emphasizes the importance of climatic factors on physiological activity and pathological conditions. The treatment is interesting but not entirely convincing. *Municipal Administration,* by John M. Pfiffner, Ronald Press, is a valuable study for the health worker who will find in this book a broad view of the coworkers in other fields which is sure to be at once stimulating and sobering. *Education of the Handicapped: Vol. II, Problems,* by Merle E. Frampton and Hugh Grant Rowell, World Book Co., meets an expressed need and should aid materially in clarifying our thinking with regard to the handicapped. It is one of a series from Teachers College, Columbia University. *A Doctor's Holiday in Iran,* by Rosalie Slaughter Morton, Funk & Wagnalls, contains much history of the country and customs but much also of recent development along social lines and in public health, brought about through medical missionaries primarily, aided by the vision and active help of Shah Riza Pahlavi, who in 14 years has accomplished more than in 100 years preceding his rule. *Civil Service in Public Welfare,* by Alice Campbell Klein, Russell Sage Foundation, is especially timely and valuable because of the extension of civil service into the realm of public welfare. *Insect Pests,* by William Clunie Harvey and Harry Hill, H. K. Lewis & Co., Ltd., is interesting and useful, prepared primarily for the information of health and sanitary officials of the British Isles under the prevailing emergency conditions. Fumigation has been treated with especial care. The book has one serious omission for use in the United States, since mosquitoes and the diseases carried by them are not mentioned. *Mosquito Control: Practical Methods for Abatement of Disease Vectors and Pests,* by William Brodbeck Herms and Harold Farnsworth Gray, Commonwealth Fund, lays emphasis on control as a sanitary and economic problem. For prevention of malaria many details in technic are inadequate.

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While a great deal of care has been given to making this selection, we realize that judgments may differ and that we may not appreciate the particular needs of every reader. Further information concerning any of these books, as well as of many others, can be obtained from our Book Service Department in the New York office. Inquiries are always welcome from members as well as others and will receive careful attention from the Book Department.

Man's Greatest Victory Over Tuberculosis — *By J. Arthur Myers, Ph.D., M.D. Springfield, Ill.: Thomas,* 1940. 421 pp. Price, $5.00.

In the first chapters of this book Dr. Myers describes the rise of veterinary medicine to its rank as a profession with high educational standards and he shows its importance in relation to the prevention of disease in human beings.

Eradicating tuberculosis from cattle (Man's Greatest Victory) was an insoluble problem until Villemin in 1865 proved its specific nature and Koch in 1882 discovered the specific cause; by isolating tuberculin in 1890 Koch also made it possible to diagnose the existence of infection in its earliest stages. Pearson worked under Koch in 1890 and brought some tuberculin to America, using it in animals and establishing its value in diagnosis. Theobald Smith described two types of the bacillus, human and bovine, the human being of feeble power in causing the disease in cattle. Ravenel in 1901 proved that "the bovine bacillus has high pathogenic power for man also, especially manifest in the early years of life," and his work showed how absolutely necessary it was to eradicate tuberculosis from cattle before there could be any possibility of success in controlling the spread of the disease in human beings. The author gives a graphic account of the battle, illustrating by maps the progress in the United States of "modified accredited areas" (in which the cattle reacting to tuberculin-injections must number less than ½ of 1 per cent after two annual tests for three successive years). At the start of the work no county could qualify, but the map for 1941 shows that every county in all the states is at least a "modified accredited area."

Dr. Myers has added greatly to the value of his book by placing at the end of each chapter a few paragraphs of summary which should be on the list of required reading for every medical student and practising physician along with a careful perusal of the final chapter, Lessons for Physicians in Human Medicine, the opening sentence of which, "Human Medicine is forty years behind veterinary medicine in the tuberculosis control program" is a rather bitter pill but true, if we except those of the profession who are working at the problem. ALFRED HAND

The March of Medicine: Number IV of the New York Academy of Medicine Lectures to the Laity— *New York: Columbia University Press,* 1940. 168 pp. Price, $2.00.

This book contains a series of six lectures outlining several phases in the development of medicine. It begins with a review of primitive elements in medical life by Dr. Alvarez, and ends with a historical sketch of the attitude toward insanity (Dr. Hoskins) and reflections upon the general rôle of psychiatry by Dr. Menninger. Thus the book opens with the oldest aspect of medicine and closes with the most modern. In between stand a lecture on the history of surgery by Dr. Heyd and two lectures dealing with hygiene and public health. The latter will be of particular interest to readers of this JOURNAL and moreover have the advantage of dealing in detail with two well-limited subjects. Dr. Larkey discusses "Health in Elizabethan England" and shows how much thought on the part of the individual as well as of the state was given to health conditions, including housing, water supply, etc. Dr. Drinker's "Not So Long Ago" centers around the life of a Philadelphia family as revealed in a diary written between 1758 and 1807. It gives a picture of the health problems of that time which is both instructive and amusing. The Drinkers were certainly among the most advanced people. They submitted to preventive inoculation of smallpox and even ac-

quired a bathtub as early as 1803. Yet their sufferings from vermin, leaking cesspools, etc., show how long a way American hygiene had to travel during the last 130 years.

The booklet, with a preface by Dr. Malcolm Goodridge, president of the New York Academy of Medicine, is attractive. The papers, addressed to a lay audience, are written in a popular style. OWSEI TEMKIN

Hygiene: A Textbook for College Students on Physical and Mental Health from Personal and Public Aspects—*By Florence L. Meredith, M.D. (3rd ed.). Foreword by Frank Howard Lahey, M.D. Philadelphia: Blakiston,* 1941. 822 pp. Price, $3.50.

This volume represents an extensive revision in organization and content of the earlier text; only the chapters on principles of mental hygiene and on the self impulse have been retained. The section on anatomy and physiology has been condensed and a new section on the effective use of medical service has been added. The book is divided into 6 parts, with a total of 49 chapters, an appendix, and a useful bibliography. As stated in the preface, there is a dominating theme: health situations in life, health objectives arising from them, and appropriate action on the part of the layman, especially the college student. A stimulating foreword directs attention to illustrations of new advances in medical science.

The ambitious task of the author has in general been performed with success from the standpoint of clarity of presentation, of content, and of most of the illustrations. In spite of the scope of the sub-title, perhaps it is too much to expect that more space be given to community hygiene, preventive medicine, and public health, even at the expense of other material. It also seems unfortunate that in a text on hygiene, some 46 pages, dealing with communicable and other diseases ("disorders of internal origin") of great importance from the standpoint of personal and public health, are set in type too small for easy reading, rather than serving as a model for sight conservation. Such limitations, however, are overshadowed by contributions to the subject of personal health which deserve praise.

IRA V. HISCOCK

Plague on Us—*By Geddes Smith. New York: Commonwealth Fund,* 1941. 365 pp. Price, $3.00.

"Though laymen are the stuff of which epidemics are made, they shouldn't meddle with epidemiology, which is an exacting science." Thus begins the prologue of *Plague on Us;* and then this self-confessed layman proceeds, with an amazing neatness, to do something not yet accomplished by the professional in public health: he places epidemiology in beautiful perspective.

In the first part of the book, without dawdling or awkwardness, the author leads one down a sort of time avenue, through shadows of ancient pestilences and classic speculations, and out into the hard light of current epidemiologic discipline. Then biology, physiology, chemistry, and their subsciences; and environment, economic problems, speed of transportation, and other factors which bear upon the health of communities and nations, are examined as to their possible and probable rôles in the ebb and flow of disease in the mass: Why one man becomes sick and another does not. Why this disease or that spreads to a hundred persons or to a million persons, or doesn't spread at all. It is obvious that to undertake such a discussion one must be prepared for painstaking library research and the mental distillation of a formidable amount of material from diverse sources. That the author has not shunned such efforts is evidenced by the range and detail of his coverage, which,

literally, is from the Greeks to the protein molecule.

Plague on Us is not written as an epidemiologist would have written it, for no authoritative position is assumed, no particular thesis is set forth, no record of research or study of the author is reported. Actually, one is inclined at first glance to consider this presentation of epidemiology to be rather casual, and this impression is contributed to by the sly humor in some of the comments and footnotes. But more careful consideration brings one to a realization that this is not casual writing, but an unusual clarity and simplicity of style, an artistry of expression seldom achieved in discussing matters scientific. This is no mean accomplishment, and one is inclined to suspect that some part of Mr. Smith's mastery of language was acquired in his ordinary work of editing the manuscripts of physicians and health officers: a sort of reverse English.

Only once in a very great while do books like this appear. It is recommended to the thoughtful and intelligent layman. It is suggested as required reading in all introductory courses in epidemiology. It might well serve as a model of clean-cut expression.

Plague on Us was the principal selection of the Scientific Book Club for February. H. S. MUSTARD

Food Values of Portions Commonly Used—*By Anna dePlanter Bowes (3rd ed. rev.). Published by the Author (311 So. Juniper St., Philadelphia)*, 1940. 31 pp. Price, $1.00.

This book contains food value tables which give the values for the protein, carbohydrate, fat, calcium, phosphorus, iron and vitamin contents of practically all the foods used in this country. The values are based on the amounts of food as measured by household measures. As these amounts are correlated with the gram weight of the measures it gives the reader the advantage of comparing portions with grams. These tables will be of distinct advantage to physicians and dietitians who are calculating diets for patients, as it is necessary to translate grams to household measures for the patient. The tables are conveniently arranged and the portions for which the food values are calculated are those most commonly used, so that the tables are practical and easy to use. ELAINE P. RALLI

Photodynamic Action and Diseases Caused by Light—*By Harold Francis Blum. New York: Reinhold Publishing Corp.*, 1941. 309 pp. Price, $6.00.

This monograph of the American Chemical Society series presents in readable form a wide range of information on a subject which cuts across many special fields of interest. It succeeds in its purpose of making the technical knowledge in this field intelligible to those whose activities may be along a wholly different line. The reviewer believes that many workers in public health will be surprised to find how closely their interests may be connected with other work which on the surface appears far afield.

There is included discussion of several diseases in domestic animals produced by light, and reviews of abnormal sensitivity to light in man, including sunburn, skin cancer, sensitization by substances coming into contact with the skin and by substances applied internally.

The American Chemical Society and the author are to be congratulated on a lucid exposition of a complex subject. REGINALD M. ATWATER

Legal Guide for American Hospitals—*By Emanuel Hayt, LL.B., and Lillian R. Hayt, M.A., J.D. New York: Hospital Textbook Co.*, 1940. 608 pp. Price, $5.00.

Since the publication in 1926 of

Lapp and Ketchum's book on *Hospital Law*, there has been no comprehensive, up-to-date text on this important subject. The present volume is, therefore, welcome not only as a much needed contribution to proper hospital administration, but as a very thorough and authoritative presentation of practically all the legal matters with which the modern hospital administrator may be confronted. In the preparation of this well written and well printed book, the authors have also had the collaboration of the Council on Government Relations of the American Hospital Association.

Much of the book is, of course, devoted to discussions of various aspects of liability, including the liability of public, private, and charitable hospitals for and to their medical, nursing, and pharmacal staffs, and the legal responsibilities pertaining to employees, patients, visitors, and the community. Other topics discussed include hospital organization and management, legal status of records, cadavers, taxes, accounts, insurance, workmen's compensation, labor relations, and abortions, contraception, and sterilization. A useful feature of the book is the digests of state legislation on many of these subjects. There is also an extensive table of cases, and a good index.

This book should be of value to all hospital administrators and their attorneys, to physicians, and to all public officials who are in any way concerned with hospitals. JAMES A. TOBEY

An Introduction to the Microbiology of Water and Sewage for Engineering Students. — *By P. L. Gainey. Minneapolis: Burgess Publishing Co.*, 1939. 283 pp. Price, $3.00.

This is the effort of an experienced teacher to acquaint the engineer student with the fundamentals of microbiology as these affect problems encountered in water and sewage treatment.

The first portion presents the situation, and deals with the details of study and of such subsequent treatment as may be required. Very fortunately, the language used is that of a master-teacher, who evidently knows how to explain, for the discussions are clear-cut and definite.

The second portion of 61 pages provides 45 well chosen exercises designed to impress the student with the necessity of learning to do by doing, and to equip him with a first-hand experience which is invaluable to the engineering student who may be confronted later by a biological problem.

The spiral ring binding and the large 8″ x 11″ pages facilitate use in the laboratory.

The book is decidedly concise. The reviewer is inclined to criticise it mildly on this score. For example, only very brief mention (p. 56) is made of the apparent toxic effect, on live stock, of certain blue-green algae.

Throughout there is a sustained effort to introduce the non-biologist or the non-chemist to the impressive array of biological factors which are strategically interrelated in water and in sewage with the physical and the chemical situations meantime.

It is unfortunate that this book, possessed as it is of real merit, should be marred by a number of errors. Among those noted by this reviewer are the following:

Page 7—" 18 mm." is not the *thickness* of a coverglass, but (apparently) its diameter. *45*—Size of protozoa . . . up to about 200 mm. (This is 8 inches.) Does the author mean microns? *47*—" fact should not be lost site of . . ." Should it not be *sight of* instead of site? *64*—(k) *Sinuous* in place of "sinnous"? *129*—Paragraph 3, last line: substitute Cyclotella for Clycotella. *134*—Paragraph Tabellaria instead of Taballaria. *131*—In column, *Chlorine*, are amounts given in p.p.m. or in lbs. per million gallons? *152* — Paragraph 3, line 3.

Corixa instead of Corexa. *154*—Last paragraph, line 4. Quietly instead of quitely. *158*—Paragraph 2, line 2, word 5. Reversed instead of reserved. *193*—Final paragraph, 13th line. Rat-tail maggots instead of "red-tail."

W. C. PURDY

Biological Stains—*By H. J. Conn. (4th ed.) Geneva, N. Y.: Biotech Publications,* 1940. 308 pp. Price, $3.00.

The fourth edition of this book differs from the third mainly in the additional descriptions of 13 dyes not previously included and in bringing up to date all statements. A detailed review is not necessary since the book is familiar to all laboratory workers using biological stains. There is no other reference source where chemical formulae and staining methods are so readily available. The author has done a real service both to research workers and practical technicians.

JOHN F. NORTON

Introduction to Parasitology: With Special Reference to the Parasites of Man.—*By Asa C. Chandler, M.S., Ph.D. (6th ed. rewritten and enlarged). New York: Wiley,* 1940. 690 pp., 309 figs. in text. Price, $5.00.

This textbook was first published twenty-two years ago under the title "Animal Parasites and Human Disease." It was originally intended for a wide range of intellectually curious readers but it was so enthusiastically accepted as a textbook in parasitology for colleges, universities, and medical schools that subsequent editions were rewritten and expanded until it is now a comprehensive textbook in the field of human parasitology. Unlike most textbooks in this field, it includes a section on spirochetes and spirilla which adds to its value, since this group of organisms is so closely related in many respects to the animal parasites.

In addition to the parasites of man, reference is made to the related parasites of domestic animals. The present edition also contains outlines of the classification of parasites, making clearer their zoölogical relationships. There are also simple keys for the identification of the important arthropods. Each parasite is dealt with from the point of view of its morphology, life cycle, relationship to disease, treatment, and prevention. Throughout the book the most recent advances in our knowledge of parasites have been added.

One of the most commendable features of the book in all its editions has been the interesting manner in which the subject is presented, thus making it attractive to elementary students. The book is profusely illustrated with drawings and a few photographs of parasites and their relationship to disease. It should receive an enthusiastic reception by teachers and students of parasitology and by public health workers.

HENRY E. MELENEY

A Surgeon Explains to the Layman—*By M. Benmoschè, M.D. New York: Simon & Schuster,* 1940. 317 pp. Price, $3.00.

The author has himself given the best summary description of the book. In the introductory chapter, he writes, "On the whole, this book is a potpourri." And so it is! It is a potpourri of anatomy, physiology, pathology, symptomatology, diagnosis, and descriptions of operative technics. The author feels justified in concocting these elements in the belief that he may thereby "dispel—through greater understanding—that unnecessary and heartbreaking fear that surrounds the word 'operation.'" The book is then a sort of Cicerone for past and prospective surgical patients. The author tells us that he has often described the more common operations to curious patients with the help of simple sketches scribbled on prescription blanks. In this

book, he has collected a variety of sketches describing the major operations the surgeon performs. An introductory chapter is devoted to the tools of surgery, chiefly anesthesia, and surgical instruments.

The scope of this work is vast; its objectives are ambitious. To cover so much ground, the author is obliged to condense his statements of the facts almost to the point of grotesqueness, and to employ bizarre analogies.

The book is unfortunately peppered with journalese jargon. Hypodermic medications are "shot," not injected. The medical world, we are told, "was aflame with the implications of the new discovery." The early microscopists used "toy microscopes." Avertin is converted from a useful anesthetic to "a routine procedure." There are, too, a number of errors in the factual data presented. To cite a few, the author rather feelingly but erroneously states that, "surgery has burst from a dark medieval era into the modern era within fifty years." (May the shade of John Hunter forgive him!)

Many of the "diagnostic-scopes," and not as the author states "one," are utilized in surgical treatment. It is not correct, as the author writes, "that not a single Caesarean section had been performed previous to 1793 in which the mother lived." There is a record of one having been successfully performed in 1500. And even a surgeon should know better than to state that, "the principal job of the skin is to excrete poisons from the body through the pores."

Withal, the lay reader is bound to get from this book some reassurance and something of an idea of what the surgeon does when he operates.

IAGO GALDSTON

Penny Marsh Finds Adventure—In Public Health Nursing—*By Dorothy Deming, R.N. New York: Dodd, Mead,* 1940. 236 pp. Price, $2.00.

This volume is intended to interest and inform girls and young women about the profession of public health nursing. It is a companion book to the author's *Penny Marsh: Public Health Nurse* and *Penny Marsh: Supervisor of Public Health Nurses,* and, in very readable style, tells the story of a rural public health nurse. The information is sound, the vehicle well chosen for this age group, and the total effect on the young reader such as to intrigue the better and more adventurous. An excellent selection for the high school vocational bookshelf.

R. M. ATWATER

Preventive Medicine—*By Mark F. Boyd, M.D., M.S., D.P.H. (6th ed.). Philadelphia: Saunders,* 1940. 588 pp. Price, $4.50.

The sixth edition follows the general pattern of the previous edition with only the revision and additions obviously necessary in the rapidly developing field of preventive medicine. The author's foreword indicates that the intention of the volume is to present, ". . . a minimum knowledge of the subject which a student of medicine should be expected to possess." The limitations necessarily imposed by an attempt to cover the entire field of preventive medicine in a single small volume are obvious, but one might question the wisdom of the relative emphasis placed upon environmental sanitation, especially since this emphasis is apparently at the expense of some of the more important problems in preventive medicine and public health, notably, tuberculosis, syphilis, pneumonia, and mental hygiene.

The revision and expansion of the section on deficiency diseases constitutes a valuable addition to the new volume. This edition, in common with most textbooks covering the large field of preventive medicine, provides a basis of subject matter. For detail, one must

refer to the more exhaustive monograph type of discussions. The reader will not find the completeness and authoritative detail found in the author's textbook on malariology.

The printing and form of the book are excellent, and the text is adequately illustrated, although some of the illustrations have become somewhat outdated. The absence of detailed references is understandable in view of the wide variety of subjects briefly treated. General reference material is given as an appendix. ERNEST L. STEBBINS

A Surgeon's Life—*The Autobiography of J. M. T. Finney. New York: Putnam,* 1940. 396 pp. Price, $3.50.

Sincere autobiographies are always interesting. In the case of this book we have the story of a man who has much to tell and who knows how to tell it. The author has been prominent in the surgical life of this country for 50 years and in the social life of one of our most charming cities for the same length of time. He has been connected with three great universities—Princeton as a student in Letters, Harvard as a medical student and while resident at the Massachusetts General Hospital, and finally Johns Hopkins in the Medical School and Hospital. In each of these fields he has been prominent. He played football at both Princeton and Harvard. During the tenure of Woodrow Wilson as President of Princeton, he was on the Board of Trustees, and his close association with Wilson was very useful during the World War, especially in the appointment of a Surgeon General of the Army.

It is impossible to mention more than a few of the many notable incidents recorded, nor can one even begin to enumerate the many great and near-great with whom the author has been associated and of whom many delightful personal sketches are given.

The story of the use of rubber gloves in surgery is interesting. Caroline Hampton, of South Carolina, was the head nurse in the Johns Hopkins Hospital operating room. She suffered very much from the antiseptics which necessarily came in contact with her hands, and her condition finally got so bad that she could no longer carry on. Everybody had noticed the great attraction between Dr. Halsted and Miss Hampton personally as well as professionally. Seeing that Dr. Welch had rubber gloves which he was using for post-mortem work, Dr. Halsted had a pair of rubber gauntlets made for Miss Hampton, which protected her hands and enabled her to continue her service. One day Dr. Bloodgood observed that if gloves were so good for the nurse why shouldn't the surgeon also use them. Thin gloves were made and came into use in the hospital, and from this it has become the practice everywhere for surgeons to use rubber gloves for operating.

Dr. Finney's ancestors were Scotch-Irish on one side, and sturdy English on the other, " long-lived, God-fearing, well educated and public spirited." Throughout his career he has been a consistent member of the Presbyterian Church, holding a number of prominent positions, and it is evident that this religious attitude in its best form has influenced and tempered his life. He stresses the importance of regarding each patient as an individual entity, and the value, even in the treatment of disease, of an insight into the character of a patient, the workings of his mental processes, and his spiritual aspirations. He quotes with approval Trudeau's definition of the true province of the doctor, " To cure sometimes, to relieve often, to comfort always."

We wish that space allowed a longer review of this charming book. While it can be recommended unreservedly for general reading and for those entering or in the medical profession, we suspect

it will be of especial interest to the graduates of Harvard, those who served at Massachusetts General Hospital, and of the Medical School of Johns Hopkins and its Hospital. The intimate sketches are charming and well done. Apart from such features, there is a chapter entitled, "The Medical World," which contains a good deal of philosophy, study of life in general, and voices the questioning that is going on in everyone's mind today. "What an indictment against present-day civilization that it is possible in this day and generation for the world to find itself in such a chaotic state, largely because of the 'delusions of grandeur' of certain misguided individuals, aided and abetted by the greed of lawless dictators!"

The book ends with a chapter, "In Retrospect," in which he again stresses the duty of the doctor, surgeon, or physician, in making the welfare of the patient the prime consideration around which the whole practice of modern medicine and surgery revolves. The author does not make light of the anxieties and physical strain to which the doctor is subjected or the tension to which his family, especially his wife, is often subjected. "The true physician is supremely happy in his work. . . . Once having caught the vision as it unfolds before his gaze, all else fades into insignificance."

It is a satisfaction to be able to say that Dr. Finney is still in prime good health, and to wish him many more years of a life which has been devoted so largely to the welfare of his fellowmen.

MAZŸCK P. RAVENEL

Youth Looks at Cancer—*By The Westchester Cancer Committee. Brookville, N. Y.: Brookville Press,* 1940. 55 pp. Price, $.75.

This small well bound book is designed to supplement biology teaching in secondary and college classes to the end that the nature of cancer may be more clearly understood. The motivation throughout is to provide a better understanding of what cancer cells are, what causes them, stimulates their growth and activity, and retards or stops this activity. The fear motive is certainly not a part of the picture. The emphasis is on the biological approach "to realize fully that cancer is the result of a fundamental change in the physiology of the cell," and that modern science now knows some ways of coping with these "mad" cells.

The reviewer believes that in this text biology teachers will find materials useful in arousing students' interest in cell construction and growth and an understanding of these processes. Carefully edited so that the vocabulary is within the range of students and the style dramatically simple, it is well adapted for supplementary reading.

Excellent photographs illustrate the text, no one of which can be censored as contributing to reactions of fear or revulsion. Each is intrinsically interesting. A good list of test questions, some suggestions for classroom, laboratory, and field studies, and a well chosen bibliography are included.

DOROTHY B. NYSWANDER

Attaining Womanhood—*By George W. Corner, M.D. New York: Harper,* 1939. 95 pp. Price, $1.00.

This is a very helpful series of talks to girls of high school age about sex and reproduction. The material is presented in a straightforward and frank manner, keeping to the scientific facts of modern biology and medicine. It is illustrated with a number of line drawings. The chapters on sex attraction and sex conduct are especially well written and should prove very helpful to adolescent girls. The book can be recommended without reservation to be placed in the hands of young girls who are seeking answers to many questions relating to sex life. RICHARD A. BOLT

A Guide to Human Parasitology for Medical Practitioners—*By D. B. Blacklock and T. Southwell. (4th ed.) Baltimore: Williams & Wilkins,* 1940. 259 pp.; 122 ills., 2 colored plates. Price, $4.00.

This book continues to be, as were the previous editions, a concise resumé of the internal parasites of man. As in previous editions the spirochetes are included since, as the authors say, they "were formerly classified with the protozoa, but are now considered more akin to the bacteria." There is no section on the arthropod external parasites but there are a few pages devoted to myiasis and, of course, the insect vectors of parasitic infections are mentioned as each infection is considered.

This edition follows the identical pattern of the previous editions. Actually, there is but slight change in detailed information, and this in only a few places. Thus an opportunity was missed to bring the classification up to date. Likewise a number of errors were continued, some of which may be noted: Trichina larvae are said to be discharged into the blood (instead of lymphatics); the daughter sporocysts are omitted from the life history of trematodes with no redia; flies and drinking water are listed as important means of transmitting many parasitic infections, including worm infections which require much more gross and direct methods of transfer; eggs of *Trichuris trichiura* are said to retain their viability for 5 years (rather than a few months); sedimentation is said to be more accurate than salt flotation for finding hookworm eggs in feces (whereas the reverse is true).

On the whole, however, the authors are to be congratulated on the degree of accuracy obtained in condensing the subject matter. Even their unequivocal handling of controversial subjects seems reasonable for a book of this type. They presuppose no parasitological background on the part of the reader and have given more than an average amount of introductory material, simplified and condensed that subject matter, and included an extraordinary amount of summary review material. This latter takes the form of indented point summaries, simple tables, and pictorial sketches.

The book is particularly adapted for self instruction and review by physicians removed from parasitological and medical centers. It is not, and not intended to be, a reference book for the more intense student of parasitology.

G. F. OTTO

In a Minor Key: Negro Youth in Story and Fact—*By Ira DeA. Reid. Washington: American Youth Commission, American Council on Education (744 Jackson Place),* 1940. 134 pp. Price, $1.25.

Here is a clear-cut factual presentation of what is happening to Negro youth in this country. It will prove helpful to all those who desire a basis of fact upon which to form judgment of what should be done about the many problems arising in this minority group.

Without bias and with a balanced viewpoint the author has presented his material in a number of chapters dealing with Negro health, welfare, recreation, housing, relief, work, and crime. A series of telling charts adds to its value. The chapter on "Planning for Survivors" gives a systematic presentation of what federal and private agencies are doing to promote inter-racial welfare. The book concludes with "Authorities for the Facts" which gives references to all the important material utilized in the various chapters.

RICHARD A. BOLT

Sex in Development. *A study of the growth and development of the emotional and sexual aspects of personality together with physiological, anatomical, and medical information on a group of*

153 normal women and 142 female psychiatric patients—By Carney Landis and (nine) Associates. Foreword by Nolan D. C. Lewis. New York: Hoeber, 1940. 329 pp. Price, $3.75.

The comparative case study was conducted by means of carefully prepared interviews in which the subject was in each case asked the same questions as nearly as possible in the manner of a clinical consultation. The workers are aware of the limitations of the methods used. The results appear of value, as intended, for basic educational and research purposes, rather than for any immediate prospect of therapeutic application. The findings are largely negative in that they fail to support unequivocally either the theories that attribute mental disorders to childhood complexes and fixations, or those that assume physical correlates for every mental deviation. On the other hand, they add to our understanding of personality development as influenced by educational and experiential factors among "normal" individuals in ways that are significant in our concern for social and personal adjustments.

BENJAMIN C. GRUENBERG

Emotional Hygiene: The Art of Understanding—*By Camilla M. Anderson (2nd ed. rev.) Philadelphia: Lippincott,* 1940. 253 pp. Price, $2.00.

This is a second edition of a popularly written volume which appeared first in 1937. Its author is a psychiatrist who has lectured to students in the department of nursing education at the University of Pennsylvania, and who addresses this volume chiefly to nurses. The language is simple, the illustrative episodes sometimes peculiarly apt, but there is hardly enough meat here for those searching for much help in this field. Certainly the chapter devoted to the problems of the public health nurse is inadequate. The book is more helpful as a stimulus to further reading and to understanding the shortcomings of one's self and one's neighbors—the purpose for which it was written. Only minor changes, according to the author, have been made from the text of the first edition, and only the new chapter entitled "That Feeling of Sureness" has been added.

LEONA BAUMGARTNER

Community Hygiene—*By Elizabeth Sterling Soule and Christine Mackenzie. New York: Macmillan,* 1940. 218 pp. Price, $1.75.

The authors of this very brief volume state that "from several years' experience it has seemed most effective to use a simple text enriched by wide reading assignments" in the teaching of public health to students in physical education, home economics, and nursing. Their book can be recommended for just such a purpose. The reviewer has used it recently to give a preliminary "bird's-eye" view of the range of the public health movement to sanitarians receiving special university training on the "short course" basis.

From the first chapter, which describes the history of public health, through the last chapter, which deals with the administration of public health services, most of the important aspects of the modern program are touched upon. Thus the intervening chapters are entitled, The Sanitation of the Food Supply, The Water Supply, Sewage Disposal, Housing, The Control of the Communicable Diseases, Community Health Problems in Relation to Maternity, Infancy, and Childhood, Programs More Recently Instituted by Official Health Agencies.

Condensation of so much subject matter in 218 small pages, inclusive of bibliography and index, is a difficult task, but on the whole the authors have chosen and treated their materials wisely.

MILTON ROSE

Child Psychology for Professional Workers—*By Florence M. Teagarden, Ph.D. New York: Prentice Hall,* 1940. 641 pp. Price, $3.25.

This is not a book for popular reading. It is, as the sub-title indicates, for professional workers. A volume of some 600 pages, it is encyclopedic in scope planned especially for those concerned with fundamental problems of child care and training. The author is convinced that "profesional workers need to know much about normal children." In dealing with abnormal children a basis of normal child psychology is essential.

The introductory chapters of this informative volume deal with principles of heredity and the application of this knowledge. These are followed by chapters on prenatal development, infancy, and the preschool child. The relation of the child to its home environment is treated in considerable detail and a number of helpful references in the literature are given. The chapters which follow deal largely with technical matters bearing upon the child's emotional life, sex, intelligence, behavior, etc. The bearing of the psychological and social problems upon the physical health and defects of the child is well set forth.

This volume should fill a place in the reference library of public health nurses, social workers, public health officers and others. RICHARD A. BOLT

The Doctor and the Difficult Child—*By William Moodie, M.D., F.R.C.P., D.P.M. New York: Commonwealth Fund,* 1940. 214 pp. Price, $1.50.

This excellent book should be welcomed, not only by the harried parent but particularly by the pediatrician whose practice during many years has included a steadily growing proportion of "difficult children."

It is the general practitioner or the pediatrician who is first consulted about the problem, the psychiatrist being as a rule called *in extremis* only, for the induction of the psychiatrist brands the child as a "mental case." The average doctor has a considerable store of practical knowledge gleaned from long experience in the supervision of such cases, but too often he fails to use his knowledge to advantage. This knowledge does not exist in usable form because he is confused by the conflicting nomenclature of psychiatry.

Dr. Moodie has avoided ponderous terms and hair-splitting definitions. His approach to his subject is direct, matter-of-fact and couched in everyday terms which reassure parent and doctor alike. What is more helpful, he considers the difficult child not just as a show-window for interesting psychological phenomena but as a human being who is unsuccessfully trying to adjust himself to his environment.

The book is well arranged, and the case histories are in general instructive. The chapter on treatment, which is particularly well executed, is full of helpful suggestions. BENJAMIN TAPPAN

Safe and Healthy Living—*By J. Mace Andress, Ph. D., I. H. Goldberger, M.D., Marguerite P. Dolch, Elizabeth B. Jenkins, and Grace T. Hallock. New York: Ginn,* 1939.

Spick and Span. 142 pp. Price, $.64.

The Health Parade. 168 pp. Price, $.72.

Growing Big and Strong. 237 pp. Price, $.76.

Safety Every Day. 235 pp. Price, $.76.

Doing Your Best for Health. 264 pp. Price, $.80.

Building Good Health. 274 pp. Price, $.84.

Helping the Body in Its Work. 282 pp. Price, $.84.

The Healthy Home and Community. 298 pp. Price, $.88.

As a set of tools to be used by a

skillful teacher in the elementary grades and in junior high schools, this series of textbooks is excellent.

The thoroughly sound scientific information and stimuli to the formation of desirable habits which the authors seek to teach is delivered in an attractive package. The illustrations are always purposeful and often beautiful. Attention has apparently been given to the principles of design as well as to the psychology of color. Legends and captions are apt.

The books are not just a set of readers. They are aids to learning—learning important facts, to forming strong habit, and to developing favorable attitudes. In addition to health information which is zestfully and systematically written, the books contain intriguing problems, things-to-do, reference lists, and usable vocabulary lists which have been planned and evidently tested by teachers who know how children learn. The unit system of organization is followed in each volume; the spiral technic is utilized in the plan of the series. The early and frequent emphasis on dental health, immunization, and accident prevention is noteworthy and commendable. An even more important consideration is that the authors have recognized the fact that children of ages 12 to 14 years have horizons broad enough to include participation in community public health practices.

The set of books could be used as the basis for an eight year course in health instruction in that term's widest and most constructive meaning.

A. P. HITCHENS

As the Twig Is Bent—*By Leslie B. Hohman, M.D. New York: Macmillan*, 1940. 291 pp. Price, $2.50.

"I am convinced beyond doubt that the psychologic equipment with which we meet the world as adults is almost entirely the result of habit training between the day of birth and the dawn of adolescence." This quotation from Dr. Hohman's book indicates its basic principles. It is evident that he pins his faith to "Nurture" rather than to "Nature." The book is well sprinkled with case histories illustrating the successful handling of difficult children. One criticism might be that the treatment applied is too uniformly successful; the failures seem to have been forgotten.

Parents will undoubtedly enjoy reading this book. Its literary style is very pleasing and its air of authority will hearten the inexperienced or discouraged mother. But the ultra-modern educator whose shibboleth is "Creative Expression" will look down his nose in stern disapproval of the author's ideas on child guidance. That will probably not worry the author at all.

The book's format is good and there is an adequate index.

MERRILL E. CHAMPION

The Girl Today—The Woman Tomorrow—*By Lucretia P. Hunter (rev. ed.). New York: Allyn & Bacon*, 1939. 374 pp. Price, $1.20.

This book is designed as a handy textbook for high school girls based upon modern educational methods. It is the outcome of extensive classroom experience in instructing adolescent girls in social behavior. The text is clearly written and profusely illustrated. High ideals of conduct are presented concisely and attractively.

The general impression given in the text and illustrations is that the appeal is to girls of the upper social and economic levels. It is difficult to conceive how young girls brought up in poor families or even in those homes with modest incomes could afford many of the articles portrayed. An extensive bibliography is given at the end which might help in securing a balanced viewpoint.

RICHARD A. BOLT

BOOKS RECEIVED

STRANGE MALADY. THE STORY OF ALLERGY. By Warren T. Vaughan. New York: Doubleday, Doran, 1941. 268 pp. Price, $3.00.

MANUAL OF CLINICAL CHEMISTRY. By Miriam Reiner. New York: Interscience Publishers, 1941. 296 pp. Price, $3.00.

THE PARASITES OF MAN. By Thomas W. M. Cameron. Toronto: University of Toronto Press, 1940. 182 pp. Price, $3.00.

WHEN CHILDREN ASK. By Margueritte Harmon Bro. Chicago: Willett, Clark, 1940. 267 pp. Price, $2.00.

WHAT PRICE ALCOHOL? Robert S. Carroll. New York: Macmillan, 1941. 362 pp. Price, $3.00.

SEWAGE TREATMENT. By Karl Imhoff and Gordon Maskew Fair. New York: Wiley, 1940. 370 pp. Price, $3.00.

MENTAL HEALTH IN THE CLASSROOM. Thirteenth Yearbook, Department of Supervisors and Directors Instruction, National Education Association, Washington, D. C., 1940. 304 pp. Price, $2.00.

DIAGNOSTIC PROCEDURES AND REAGENTS. Tecnics for the Laboratory Diagnosis and Control of the Communicable Diseases. New York: American Public Health Association, 1941. 352 pp.; Index, 16 pp. Price, $2.75.

PERIODICITY AND CAUSE OF CANCER, LEUKAEMIA AND ALLIED TUMORS. By J. H. Douglas Webster. Baltimore: Williams & Wilkins, 1940. 178 pp. Price, $3.50.

BIOLOGICAL ASPECTS OF INFECTIOUS DISEASE. By F. M. Burnet. New York: Macmillan, 1941. 310 pp. Price, $3.75.

COMMUNITY HYGIENE. By Laurence B. Chenoweth and Whitelaw Reid Morrison. 2nd ed. New York: F. C. Crofts, 1941. 317 pp. Price, $2.60.

AMERICA ORGANIZES MEDICINE. By Michael M. Davis. New York: Harper, 1941. 335 pp. Price, $3.00.

WHAT ARE THE VITAMINS? By Walter H. Eddy. New York: Reinhold, 1941. 247 pp. Price, $2.50.

THE WOMEN'S DIVISION NATIONAL AMATEUR ATHLETIC FEDERATION. By Alice Allene Sefton. Stanford University Press, 1941. 87 pp. Price, $2.00.

AGE MORPHOLOGY OF PRIMARY TUBERCLES. By Henry C. Sweany. Springfield: Thomas, 1941. 265 pp. Price, $5.00.

HEALTH, SAFETY, GROWTH SERIES. By C. E. Turner, Juanita McD. Melchior, Grace Voris Curl, C. E. Burton. New York: Heath, 1941.

GAINING HEALTH, $.76.

BUILDING HEALTHY BODIES, $.88.

CLEANLINESS AND HEALTH PROTECTION, $.76.

WORKING FOR COMMUNITY HEALTH, $.84.

DENTAL HEALTH EDUCATION AND DENTAL HEALTH SERVICE IN HAWAII: A SURVEY. By Guy S. Millberry, D.D.S. Honolulu, Hawaii: The Strong Foundation, 1940. 185 pp.

THE AMERICAN COLLEGE OF PHYSICIANS—ITS FIRST QUARTER CENTURY: A HISTORY. By William Gerry Morgan, M.D., LL.D., Sc.D. Philadelphia: American College of Physicians, 1940. 276 pp. Price, $2.00.

PERCHLORAN. Philadelphia: Pennsylvania Salt Manufacturing Co. (1000 Widener Bldg.), 1941. 32 pp.

STUDIES ON TUBERCULOSIS. The American Journal of Hygiene Monographic Series, No. 16, February, 1941. Baltimore: Johns Hopkins Press. 198 pp.

THE AVITAMINOSES. By Walter H. Eddy and Gilbert Dalldorf. 2d ed. Baltimore: Williams & Wilkins, 1941. 519 pp. Price, $4.50.

THE ROMANCE OF MEDICINE IN CANADA. By J. J. Heagerty. Toronto: Ryerson Press, 1940. 113 pp. Price, $1.25.

DISEASES TRANSMITTED FROM ANIMALS TO MAN. By Thomas G. Hull. Springfield: Thomas, 1941. 403 pp. Price, $5.50.

MEDICINE AND HUMAN WELFARE. By Henry E. Sigerist. New Haven: Yale University Press, 1941. 148 pp. Price, $2.50.

DELINQUENCY CONTROL. By Lowell Julliard Carr. New York: Harper, 1941. 447 pp. Price, $3.50.

YOUR COMMUNITY. ITS PROVISION FOR HEALTH, EDUCATION, SAFETY AND WELFARE. By Joanna C. Colcord. rev. ed. New York: Russell Sage, 1941. 261 pp. Price, $.85.

MAGIC IN A BOTTLE. By Milton Silverman. New York: Macmillan, 1941. 332 pp. Price, $2.50.

NATURAL RESISTANCE AND CLINICAL MEDICINE. By David Perla and Jessie Marmorston. Boston: Little, Brown, 1941. 1344 pp. Price $10.00.

HEALTH IN ICELAND. By Vilmundur Jonsson. A Reprint from the Report on Public Health in Iceland, 1938. Reykjavik, Iceland, 1940. 29 pp.

WOLF CHILD AND HUMAN CHILD. A Narrative Interpretation of the Life History of Kamala, the Wolf Girl. By Arnold Gesell. New York: Harper, 1941. 107 pp. Price, $2.00.

AMERICAN MUSEUM OF HEALTH. Report for 1939 and 1940. New York: Flushing Meadow Park, 1941. 40 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Children's Teeth — Structurally soundest are those teeth formed *in utero* before dietary deficiencies are normally felt by the child. This suggestive finding is from a study of London children which showed that improved nutrition as measured by the height-weight index is associated with better dental health.

ALLEN, I. A Survey of Nutrition and Dental Caries in 120 Elementary School Children. Brit. M. J. 4175 (Jan. 11), 1941.

Mental Health and Welfare—In 8 states, the state hospitals provide community psychiatric services. The example of what is done by the Worcester (Mass.) hospital should prove of interest to health administrators who have not yet worked out a satisfactory solution to the ever present problem of adult mental health. Incidentally health workers will find in the bulletin of the A. P. W. A., in which this paper appears, many useful discussions of the social aspects of public hygiene.

BARTON, W. E. The State Hospital: Consultant in Community Mental Health. Pub. Welfare News 9, 2:2 (Feb.), 1941.

Brothers Under the Skin—We are reminded frequently of the great similarity between the Australians and ourselves—devil-may-care fighters and all that! Now it seems that we may both enjoy the same variety of "Q" fever.

BENGTSON, I. A. Immunologic Relationships Between the Rickettsiae of Australian and American "Q" Fever. Pub. Health Rep. 56, 7:272 (Feb. 14), 1941.

Measuring Human Comfort—Conditions of the air which determine the sensation of bodily comfort are, as most of us know, temperature, moisture content, movement, and radiation transfer between the body and other surfaces. Some of the recent research in body reactions to varying atmospheric conditions is summarized in this article.

FERDERBER, M. B., and HOUGHTEN, F. C. Effective Temperature Scale. J. A. M. A. 116, 6:474 (Feb. 8), 1941.

Scarlet Fever Prophylaxis — We believe that the intradermal method of immunization (with scarlatinal toxoid) is superior to the subcutaneous route, these writers conclude. They have found a decrease in severity of reactions which they attribute to the smaller doses needed and the slower absorption.

FISCHER, S., and VAN GELDER, D. W. Intradermal Immunization. Am. J. Dis. Child. 61, 1:88 (Jan.), 1941.

Vaccination Prevents Smallpox—Who was it in "Alice" who made it a practice to believe two difficult things each day? Well here are two facts for you to exercise your believing powers upon. Six states have no statutes referring in any manner to vaccination. Vaccination is a prerequisite to school attendance in only 12. From this point on the believing becomes easier.

FOWLER, W. Principal Provisions of Smallpox Vaccination Laws and Regulations in the United States. Pub. Health Rep. 56, 5:167 (Jan. 31), 1941.

Men, Horses, and Encephalitis—When the much-written-up Massachusetts outbreak of equine encephalitis was under way another outbreak was decimating the horse population of

Saskatchewan. Here, however, the human cases were fewer and the mortality rate was much less than in Massachusetts. It appears that the eastern and western types of virus are not serologically related.

GAREAU, U. Clinical Aspects of an Epidemic of Human Encephalomyelitis in Saskatchewan in 1938, (and) FULTON, J. S. Relation of Equine Encephalomyelitis to the Epidemic of Human Encephalitis in Saskatchewan in 1938. Canad. Pub. Health J. 32, 1:1 (Jan.), 1941.

Influenza Research—Although it is unlikely that you will make an immediate use of this information, you may still be interested to learn that mice—and perhaps men—may be protected, for about 10 days, against influenza virus by intranasal administration of immune serum. Larger doses given intravenously protect for about twice as long a time.

HENLE, W., *et al.* Passive Immunization of Mice against Human Influenza Virus by the Intranasal Route. J. Immunol. 40, 2:201 (Feb.), 1941.

Rats, Mice, and Recent History—In another of the excellent "medical progress" series, the recent work in the study of rat-bite fever, rickettsial infections, Weil's disease, tularemia, and brucellosis—is reviewed. A great deal of information is packed into 5 pages, and an excellent bibliography is appended.

KEEFER, C. S. Uncommon Infectious Diseases in New England. New Eng. J. Med. 224, 6:242 (Feb. 6), 1941.

It Can Happen Here—Coventry's health officer takes stock after the Luftwaffe had finished its hideous business. Typhoid immunization, shelter sanitation, hospitalization problems, and mental hazards provide an emergent problem, but do not obscure the health officers' interest in the later sanitary aspects of reconstruction.

MASSEY, A. Some Public Health Considerations Consequent Upon a Large-Scale Air Raid. Brit. M. J. 4176 (Jan. 18), 1941.

Spread of Polio Virus—Among the theoretical channels by which poliomyelitis can be transmitted are food, milk, and water. Polluted watercourses may be related to these channels, for the virus has repeatedly been isolated from "running" sewage. A distinguished commentator suggests that the authors be credited as originators of the isolation technic employed.

PAUL, J. R., and TRASK, J. D. The Virus of Poliomyelitis in Stools and Sewage. J. A. M. A. 116, 6:493 (Feb. 8), 1941.

"Peace Hath Her Victories"—How the work of the official and voluntary nursing programs were combined in Westchester County, N. Y., is a story with which everyone should be familiar. That there are a surprising number of monkey wrenches everywhere ready to be heaved into such a machine will not be news to most of us.

PRINDIVILLE, M. A Joint Voluntary and Official Program. Pub. Health Nurs. 33, 2:96 (Feb.), 1941.

A New Disease to "Ketch You if You Don't Watch Out"!—Another disease simulating the typhus-spotted fever group is described. Its name is toxoplasmosis, and it has been recognized since 1900 as an animal disease. Tick transmission is suggested, but other more direct means of transfer may exist.

PINKERTON, H., and HENDERSON, R. G. Adult Toxoplasmosis, (and) SABIN, A. B. Toxoplasmic Encephalitis in Children. J. A. M. A. 116, 9:807 (Mar. 1), 1941.

Inherited Human Anomalies—Are you a P. T. C. Taster? Two chemists tested a large number of individuals and discovered that 70 per cent found phenyl thiocarbamide to be very bitter, whereas to 30 per cent it had no taste whatever. Inability to taste the chemical is inherited as an autosomal recessive. Perhaps you had better read the paper if you are curious to know what that is.

STRANDSKOV, H. H. The Distribution of Human Genes. Scient. Monthly 52, 3:203 (Mar.), 1941.

Housing and Health—Milwaukee is attempting to control the housing situation in congested areas so that safe and decent places to live, measuring up to known and enforcible standards, may be provided for people with low incomes. Close coöperation exists between the health and building inspection departments and this has helped.

SENN, C. L. Procedure for the Maintenance of Housing Standards in Milwaukee. Pub. Health Rep. 56, 5:189 (Jan. 31), 1941.

The Viruses — Those who want orientation in this expanding area of biology will find this essay lucid and interesting.

STANLEY, W. M. Some Chemical, Medical and Philosophical Aspects of Viruses. Science, 93:2407 (Feb. 14), 1941.

For Rheumatic Fever Susceptibles—Promising indeed is this latest report upon the prophylactic value of small doses of sulfanilamide in preventing returns of rheumatic fever in susceptible children. It is devoutly to be hoped that more will be learned about this apparent aid in the difficult public health problem presented by rheumatic fever.

THOMAS, C. B., *et al.* The Prophylactic Use of Sulfanilamide. J. A. M. A. 116, 7:551 (Feb. 15), 1941.

Have you seen the Nomination Blank on page XXXIX?

ASSOCIATION NEWS

SEVENTIETH ANNUAL MEETING
ATLANTIC CITY, N. J., OCTOBER 14–17, 1941

HEADQUARTERS
Convention Hall

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Eusebio, D. Aguilar, M.D., Director of Health, Manila, Philippine Islands

Carroll T. Bowen, M.D., 501 South Andrews Ave., Fort Lauderdale, Fla., Director, Broward County Health Dept.

Louis A. Breffeilh, M.D., Avoyelles, Parish Health Unit, Marksville, La., Medical Director

Irving J. Crain, M.D., 1542 E. 9th St., Brooklyn, N. Y., Health Officer in Training, Dept. of Health, City of New York

James E. Davey, M.B., 20 Main St., W., Hamilton, Ont., Can., Medical Officer of Health

Harry-Rolf Germer, M.D., M.P.H., Dept. of Public Health & Preventive Medicine, Univ. of Texas, Galveston, Tex., Assistant Director of Public Health and Preventive Medicine

Charles W. Harwell, M.D., Crisp County Dept. of Health, Cordele, Ga., Commissioner of Health

William K. McDowell, M.D., C.P.H., 1009 Panola, Tarboro, N. C., Director, Edgecombe-Greene Health District

Nicholas D. McGlaughlin, M.D., 3400 Biddle Ave., Wyandotte, Mich., Commissioner of Health

Anton C. Sibilsky, M.D., Health Unit, Lewiston, Ida., Acting Director, North Central District Health Unit

John D. Winebrenner, M.D., 912 Forest St., Ann Arbor, Mich., Student trainee, Univ. of Michigan

Jacob Zinbarg, D.D.S., 6350 Wetherold St., Rego Park, N. Y., Chief, Dental Division, National Youth Administration

Laboratory Section

Rosario Berard, M.D., City Hall, Municipal Laboratory, Montreal, Que., Can., Superintendent-Bacteriologist

Alexander G. Campbell, B.S., Dept. of Pensions & National Health, John & Sussex Sts., Ottawa, Ont., Can., Junior Bacteriologist, Laboratory of Hygiene

Olan W. Dillon, Jr., 126 Groveland Place, San Antonio, Tex., Junior Bacteriologist, Health Dept.

Sanford S. Elberg, Ph.D., 619-43rd Ave., San Francisco, Calif., Instructor in Bacteriology, San Francisco Junior College

Moses L. Isaacs, Ph.D., 600 West 168th St., New York, N. Y., Assistant Professor of Sanitary Science, DeLamar Institute of Public Health, Columbia Univ.

Florence Makower, 2419 Durant Ave., Berkeley, Calif., Student in Public Health, Univ. of California

Robert E. Power, Fillmore Farms Inc., Bennington, Vt., Laboratory Technician

Grace M. Sickles, B.A., 2201 Twelfth St., Troy, N. Y., Associate Bacteriologist, Division of Laboratories and Research, State Dept. of Health

John F. Von der Lieth, Ph.B., Sc.M., 768 Bergen Ave., Jersey City, N. J., Director, Hudson County Board of Health Laboratories

Alan E. Wicks, B.A., Box 1931, Juneau, Alaska, Laboratory Technician, Territorial Dept. of Health

Vital Statistics Section

Arthur Lenz, B.S., 3101 Avenue I, Brooklyn,

N. Y., Statistical Clerk, New York City Dept. of Health

T. G. Mongan, 325 E. Broadway, East St. Louis, Ill., Chief Clerk and Statistician, East Side Health Dist.

Engineering Section

Bergen F. Berkaw, B.S.of C.E., 327 S. Main St., Lexington, Va., County Health Engineer, Rockbridge Health Dept.

Reginald Bowering, M.S., Provincial Board of Health, Parliament Bldgs., Victoria, B. C., Can., Public Health Engineer and Chief Sanitary Inspector

Joseph E. Flanagan, Jr., B.S., 418 Oakland Ave., Greensburg, Pa., Assistant Sanitary Engineer, U. S. Public Health Service

Chris A. Hansen, B.S.in C.E., 222 S. 11th St., Griffin, Ga., Public Health Engineer, State Health Dept.

Eric W. Mood, B.S., Ives St., Mt. Carmel, Conn., Sanitary Engineer, New Haven Water Co.

Earle W. Sudderth, B.S., City Hall, Houston, Tex., Industrial Hygiene Engineer, Division of Industrial Hygiene, State Dept. of Health

Industrial Hygiene Section

Frank E. Adley, B.S., Barre City Hospital, Ind. Hyg. Off., Barre, Vt., Industrial Hygiene Engineer, State Health Dept.

Robert B. Aiken, M.D., 7 Orange St., Barre, Vt., Medical Director of Industrial Hygiene, State Dept. of Health

William H. Krecker, Jr., Ch.E., 5331 N. Carlisle St., Philadlphia, Pa., Chemical Engineer, Bureau of Industrial Hygiene, State Dept. of Health

Food and Nutrition Section

Cyril C. Sullivan, B.S., 408 Atlantic Ave., Boston, Mass., Chief Inspector, Boston Station, Food and Drug Administration

Maternal and Child Health Section

Glenn D. Hutchinson, M.D., Pioche, Nev., County Physician

Ralph E. Weddington, M.D., Barnett Bldg., Batesville, Ark., Medical Director, Independence County Health Unit

Carl E. Weigele, M.D., M.P.H., 455 West State St., Trenton, N. J., Medical Assistant, State Dept. of Health

Public Health Education Section

Thomas W. Clune, D.M.D., 1282 Cranston St., Cranston, R. I., Public Health Dentist, State Dept. of Health

Jennie Cole-Asarian, B.A., 280 Loretto St., Tottenville, S. I., N. Y., Substitute Teacher of Hygiene and Home Nursing, New York City Board of Education

Electa G. Gartin, B.S., R.N., Health Unit, Lewiston, Ida., Supervising Nurse, North Central District Health Unit

W. Russell Greenwood, M.D., Rutgers Univ. Infirmary, New Brunswick, N. J., Director of Student Health

Pasquale J. Pesare, B.S., C.P.H., 139 Devonshire, Providence, R. I., Genito-Infectious Disease Laboratory Consultant, State Dept. of Health

William Roemmich, M.S., 701-11th St., Bismarck, N. D., Director of Health Education, State Dept. of Public Health

Wellington P. Shahan, A.B., 907 First National Bank Bldg., Springfield, Ill., Executive Secretary, Illinois Tuberculosis Assn.

Public Health Nursing Section

Jane P. Brown, R.N., B.S., State Dept. of Health, 1412 Smith Tower, Seattle, Wash., Consultant Public Health Nurse in Orthopedic Nursing

Mildred D. Byers, B.S., Board of Health, Honolulu, T. H., Associate Director, Bureau of Public Health Nursing

G. Aileen Dyer, B.S., 1206 S. W. Gibbs St., Portland, Ore., Field Advisory Nurse, Div. of Public Health Nursing, State Board of Health

Mary C. Fulton, R.N., B.Ph., 1806 Maple Ave., Evanston, Ill., Director of Nurses, Evanston Infant Welfare Society

Mary Ellen Redmond, R.N., 404 King St., Bay City, Mich., Director, Public Health Nursing Service

Hazel M. Reed, A.B., R.N., Visiting Nurse Assn. of Albany, Inc., 245 Lark St., Albany, N. Y., Director

Rose S. Reith, R.N., 300 Franklin Ave., Astoria, Ore., Clatsop County Probation Officer

Nellie A. Simmons, R.N., General Hospital, Paterson, N. J., Educational Director, School of Nursing

Epidemiology Section

Paul M. Brick, Health Dept., Coral Gables, Fla., Director, Dept. of Inspection

Alvin A. Florin, M.D., 217 Lark St., Albany, N. Y., Epidemiologist-in-Training, State Dept. of Health

Eleanor M. Roche, 28 Kittredge Terrace, San Francisco, Calif., Student, Univ. of California

Sylvio Torres, D.M.V., Rua Ibituruna 12 casa 7, Rio de Janeiro, Brazil, S. A., Chief Assistant, Division of Animal Pathology, Dept. of Agriculture

Unaffiliated

Randolph G. Bishop, Shoreham Bldg., Washington, D. C., Executive Secretary, National Dental Hygiene Assn.

Cloyd M. Chapman, Powers X-ray Products, Inc., Glen Cove, N. Y., Engineer, Public Health Division

Conrad G. Selvig, M.A., 1303 Georgina Ave., Santa Monica, Calif., Member, Board of Directors, American Society for the Hard of Hearing

Anatole A. Solow, 285 Edgewood Ave., New Haven, Conn., Research Assistant, Committee on Hygiene of Housing, American Public Health Assn.

Louis F. Westbrook, B.S., 4746 N. W. 10th Ave., Miami, Fla., Sanitary Officer, Dade County Health Dept.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

The American Public Health Association has been requested to prepare a reservoir of the names of persons eligible for appointment as physicians with experience or special interest in public health work, as industrial hygienists, as engineers, and as laboratory technicians. Persons with training and experience in these fields are invited to register with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

Bacteriologist — Alexandria, Virginia, City Department of Health. Milk, water serological and general examinations. Salary $1,200 to $1,800 according to training and experience. Apply to W. A. Browne, M.D., Health Officer.

Physician with public health training to serve as full-time county health officer in rural South Atlantic area. Salary $3,600 to $4,000. Write Box C, Employment Service, A.P.H.A.

The Arlington County Health Department in Arlington, Va., announces a vacancy for a male bacteriological technician, salary $1,900 per annum, which may be increased for satisfactory service. Applicants should apply to R. G. Beachley, M.D., Director of Health and Welfare.

Public Health Nurse—General nurse for Alexandria, Va., City Health Department. Must be a graduate of an accredited hospital with special training and experience in public health. Salary $1,620 to $1,800 according to qualifications. Apply to W. A. Browne, M.D., Health Officer.

County Public Health Nurses for New Mexico. Must have 4 months postgraduate instruction under one of the recognized public health nursing courses and 1 year's experience. Must drive and have a car. Address inquiry to State Health Department, Santa Fe, New Mexico.

U. S. CIVIL SERVICE COMMISSION

The Commission has announced that applications will be received for positions as Senior Medical Officer ($4,600), Medical Officer ($3,800), and Associate Medical Officer ($3,200), for appointments in the Public Health Service, with the Food and Drug Administration, Veteran's Administration, and the Indian Service. Forms for application may be obtained from the U. S. Civil Service Commission, Washington.

The Commission also announces that applications may be filed for the positions of Public Health Nurse ($2,000) and Graduate Nurse, general staff duty ($1,800) in the Indian Field Service, including Alaska. Forms may be obtained from the U. S. Civil Service Commission, Washington.

POSITIONS WANTED

ADMINISTRATIVE

A woman physician with rather unusual qualifications in maternal and child health, state and local experience, now completing courses for M.P.H. Especially interested in local health administration. **A376**

Physician, aged 39, excellent graduate training and experience in public health, specialized in tuberculosis and epidemiology, now employed, will consider position with salary of $4,500 or better. **A473**

Experienced physician, graduate University of Illinois, M.P.H. Johns Hopkins 1940, seeks administrative opening suitable to his proven ability. Excellent references. **A466**

Physician, M.P.H. Harvard, well experienced in city and rural health administration, will consider appointment as district health officer in city or state health department. **A418**

Physician, aged 38, M.P.H. Harvard 1932, experienced as director of county units and in state department of health. Will consider administrative position. **A474.**

Physician, graduate of University of Iowa, candidate for Dr.P.H. at Harvard, seeks good administrative position. **A476**

Physician, M.D. Yale; M.S.P.H. Columbia; also short course for health officers, Vanderbilt. Good clinical background, 3 ears' public health experience. Will consider appointment in child health, epidemiology or public health administration. **A350**

Experienced physician with A.B. and M.D. from University of Pennsylvania, and M.P.H. from Yale, desires full-time position as health officer. Will consider going abroad with relief expedition to Europe or Asia. **A477**

Physician, specialist in maternal and child health. M.D. University of Kansas, M.P.H. Harvard. Excellent background in pediatric residences, experience in municipal and county health work and as director of maternal and child health in state health departments. Desires position as director of a state program, as pediatrician, or in school or college health program. **A479**

Dentist, University of Pittsburgh. D.D.S., M.P.H. University of Pennsylvania 1941, experienced in practice, wishes an administrative position in public health, preferably at state level. **M450**

HEALTH EDUCATION

Well qualified woman physician, M.A. and M.D. from Stanford, with 6 years' experience in nationally known secondary school in health education and medical advisory duties, wishes position in college health work. **H448**

Health educator with excellent background of teaching experience in schools. M.S.P.H. University of Michigan. Wishes position where skill with educational sound film projection and other recognized technics will be appreciated. **H405**

Public health nurse, M.A. Columbia, experienced in teaching health education and public health nursing. Wishes teaching position in college or university summer of 1941. **H472**

LABORATORY

Experienced woman bacteriologist, Ph.D. University of Illinois 1937, wishes position in teaching or research. Excellent bibliography and references. **L410**

Experienced bacteriologist, young man of 33, Sc.B., who for several years has been in charge of state laboratory doing public health and diagnostic bacteriology, immunology, and serology, will consider opening. **L427**

SANITARY ENGINEERING

Engineer, aged 38, 3 years' experience as district sanitary supervisor, state department of health, together with work on plumbing, heating, and ventilation, will consider position in the plumbing or heating field or state department of health. Prefers middle western or western states. **E453**

Public Health Engineer, B.S. in Sanitary Engineering from Massachusetts Institute of Technology, experienced in Massachusetts, Connecticut, and Kentucky, seeks position as sanitary or public health engineer with health department. **E380**

Engineer with good training and experience in water treatment, sewage plant operation and in research, wishes position as superintendent. Can go anywhere. **E422**

Advertisement

Opportunities Available

PUBLIC HEALTH PHYSICIANS—(a) County health physician; duties will include supervision maternal and child health program, communicable disease control; about $4,200; East. (b) Young physician qualified to take charge of health center to be established soon; Florida. (c) Physician with public health training, qualified also in obstetrics or pediatrics; interesting appointment, state health department; $3,300, travel allowance; opportunity advancement. (d) District health physician; $4,200, plus $600 travel allowance; M.S. in public health, experience in rural health work required. (e) Venereal disease clinician; special training not required; county health department. (f) City physician; $250, private practice privileges; city of 25,000; South. (g) Physician to take charge state program of industrial hygiene; $300, plus travel allowance. PH4–1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

STUDENT HEALTH PHYSICIAN—Four year appointment with university health service; opportunity to combine duties with training leading to M.S. in public health or other specialty. PH4–2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

GRADUATE NURSE—For interesting appointment, health education department of state institution; Degree required; duties include clinic work, care of sick children in infirmary, teaching of health classes; September through June; excellent living conditions; East. PH4–3, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

PUBLIC HEALTH NURSES—(a) Several for county health nursing positions; $135–$150; West. (b) Several for staff positions with state board of health; year's training public health, additional experience required; $1,800, plus $600 travel allowance; Southwest. (c) Certified public health nurse; city health department; 18 nurses on staff; department covers all school nursing in city, also conducts maternity center; Midwest. PH4–4, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

SCHOOL NURSE—Certified public health nurse qualified to teach public health nursing; city school system including township high school, two grammar schools; $1,700; pleasant little town about two hours' drive from Chicago. PH4–5, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

EDUCATIONAL DIRECTOR — Certified public health nurse with degree and considerable public health experience in an executive capacity for appointment as educational director; state department of public health nursing; about $175. PH4–7, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

OUTPATIENT DEPARTMENT SUPERVISOR —Recently reorganized department, located on ground floor, fairly large eastern hospital; public health nurse with sound educational background required; adequate staff of assistants. PH4–6, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

JUNIOR BACTERIOLOGIST—Municipal health department; bacteriology or chemistry major with minimum two years' laboratory experience required; experience must have been gained in state or municipal health laboratory; $150; midwestern metropolis. PH4–8, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

Advertisement

Situations Wanted

PUBLIC HEALTH NURSE—Graduate of eastern training school; B.S. degree in Public Health Nursing, Columbia; 10 years, director of nurses, public health nursing association; 5 years, field supervisor, large industrial company; 3 years, educational director and supervisor, Visiting Nurse Association; immediately; previous executive appointment in public health nursing. PH4–9, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

BACTERIOLOGIST — A.B., Ph.D., state university; 6 years, university laboratory of animal pathology; 4 years, parasitologist, state department public health. PH4–10, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

PUBLIC HEALTH PHYSICIAN—B.S. and M.D. degrees state university; M.P.H. Johns Hopkins; 4 years, director of county health unit; recommended as highly skilled man in the field of public health theory and administration. PH4–11, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

NEWS FROM THE FIELD

DIAMOND JUBILEE, NEW YORK CITY BOARD OF HEALTH

THE 75th Anniversary of the founding of the New York City Board of Health was observed in the Health Department auditorium, 125 Worth Street, on March 5 with a program at which Dr. John L. Rice presided, the speakers including Dr. Haven Emerson, Dr. James Alexander Miller, and Mayor Fiorello H. LaGuardia.

Dr. Rice pointed out in introducing Dr. Emerson that Dr. Emerson's father was one of the very first appointees as Medical Inspector on the founding of the New York City Board of Health, and he presented Dr. Emerson with a photostatic copy of the oath of office taken by his father on that occasion. Dr. Emerson presented an address and offered to Dr. Rice the first bound copy of the complete consolidated statistics of the New York City Board of Health covering the first seventy-five years.

Mayor LaGuardia announced a plan to establish a Medical Research Bureau as part of the New York City Department of Health with the hope that it could be under way during the current year. The institute would be devoted to major problems of public health and would draw promising young scientists from wherever they could be found. He said that the Board of Health was studying ways of financing such a venture and was considering the imposition of a fee of one dollar for each marital blood test.

Dr. Rice recalled that a former mayor of New York City, when asked to call together the Board of Health for an urgent matter of epidemic control, expressed the candid opinion that the Board of Health was more of a menace to New York City than the epidemic. Following this episode, the State of New York authorized the establishment of a Metropolitan Board of Health which included not only the portion then included in New York City but Brooklyn, Queens, and Westchester Counties as well.

NEW HOUSING UNIT IN CONNECTICUT STATE HEALTH DEPARTMENT

THE Connecticut State Department of Health has given recognition to housing as a field of public health activity by creating a full-time housing division in The Bureau of Sanitary Engineering. Under the State Merit System procedure a newly created position of Housing Engineer was filled on January 1, 1941, by the appointment of Eugene L. Lehr, previously a sanitary engineer on the department staff, who will work under the direction of Warren J. Scott, Bureau Director.

Advisory service to local health officials on problems of housing inspection and enforcement will be a major activity of the new unit. Coöperation with local health and housing officials in the conduct of special housing surveys in congested urban districts is now being planned.

As a part of the early program, a critical review will be undertaken of the present state tenement house and lodging house laws, looking toward possible revision of these laws in line with modern practice elsewhere.

Problems of water supply and sewage disposal in areas not served by public facilities will be a further concern of the housing division. At the present time local health officers are being urged to sponsor ordinances under which sewage disposal facilities will be approved prior to construction of dwellings.

Consulting service in connection with this program is being furnished by the Committee on the Hygiene of Housing of the American Public Health Association.

REVISION OF THE TREASURY DRINKING WATER STANDARDS

THE requirements for drinking and culinary water provided by common carriers for the use of passengers carried in interstate traffic, commonly known as the "Treasury Department Drinking Water Standards," were last revised in 1925, and published in *Public Health Reports* of April 10 of that year. Since that time many improvements in water supply practice have been adopted with resulting increased uniformity of quality and safety to the consumer. The revision of the standards to conform more closely to current requirements for water supplies of attainable safety and potability is accordingly in order.

To carry out such a revision, the Surgeon General of the U. S. Public Health Service has appointed a special advisory committee composed of representatives of various federal organizations and scientific associations and several members at large. A smaller subcommittee of U. S. Public Health Service officers has been designated to prepare tentative suggestions for changes in the present standards which will be submitted for the consideration of the advisory committee.

The membership of the advisory committee, together with the name of the organization which each represents, is as follows:

U. S. Public Health Service
Chairman:
Joseph W. Mountin, M. D.
Assistant Surgeon General
Domestic Quarantine Division
Secretary:
J. K. Hoskins, B.S., C.E.
Chief, Sanitation Section
Domestic Quarantine Division

American Chemical Society
A. M. Buswell, Ph.D.

American Public Health Association
Abel Wolman, Dr.Eng.

American Society of Civil Engineers
Arthur E. Gorman

American Water Works Association
Charles R. Cox

Society of American Bacteriologists
A. C. Hunter, Ph.D.

Conference of State Sanitary Engineers
Arthur D. Weston

Food and Drug Administration
J. W. Sale

U. S. Geological Survey
W. D. Collins

Association of American Railroads
R. C. Bardwell

Members-at-large
R. F. Goudey, M.S.
R. E. Buchanan
Herman G. Baity, Sc.D.

The subcommittee, officers of the U. S. Public Health Service, consists of the following members:

H. W. Streeter
C. C. Ruchhoft
C. T. Butterfield, M.S.
Lawrence T. Fairhall
R. E. Tarbett, C.E.

HARVARD SUMMER COURSES IN INDUSTRIAL HYGIENE

OWING to the demand of the government services and of the defense industries for physicians and engineers trained in industrial hygiene, the Harvard School of Public Health is planning to offer both its lecture and laboratory courses in this field, ordinarily given in the academic year, in a special summer course running from May 1 through July. Details may be secured from the Secretary of the School, 55 Shattuck Street, Boston, Mass.

WATERBURY, CONN., HEALTH COUNCIL

A HEALTH Council comprising representatives of medical, dental, civic, and other agencies has been formed in Waterbury, Conn. The purpose of the Council, which is an outgrowth of the Waterbury Citizens' Advisory Committee on Health, will be, among other things, to develop a cooperative program with all community public health agencies.

MASSACHUSETTS

STREAM POLLUTION

A MASSACHUSETTS committee consisting of the following members has been appointed by Governor Saltonstall, to work with similar committees of the New England states for the classification of state waters from the standpoint of pollution:

Arthur D. Weston, Chief Engineer of the Department of Public Health, Chairman
Raymond J. Kenney, Commissioner of the Department of Conservation
Richard K. Hale, Director, Division of Waterways, Department of Public Works
Otis D. Fellows, Chief Engineer, State Planning Board

This is the result of certain activities of the National Resources Planning Board, Water Resources Agencies in New England.

Bills filed with the Massachusetts Legislature would authorize the State Department of Public Health to adopt rules and regulations relative to stream pollution and order the installation of municipal sewage treatment works.

NATIONAL DEFENSE

Massachusetts has set up a state emergency plan for use in any emergency including national defense which coördinates the facilities of all state departments under the direction of the Adjutant General. The Health Program under this plan further coördinates the work of the health officers and sanitary engineers in the field and laboratories with the central office.

The Massachusetts Department of Public Health is sponsor for three large WPA projects which provide for environmental sanitation studies in the vicinity of military areas and construction of remedial sanitary works.

The Director of the Division of Sanitary Engineering of the Massachusetts Department of Public Health has been named chairman of the subcommittee of the Northeastern Section of the American Society of Civil Engineers covering matters of sanitary and public health engineering. The work of this committee is coördinated with the work of the main committee of the American Society of Civil Engineers.

In connection with the meeting of the New England Health Institute, to be held at the Hotel Statler, Boston, April 2–4, there is to be a meeting of the section of Environmental Sanitation on April 3 jointly with the New England Water Works Association and the New England Sewage Works Association, at which various well known speakers are to present papers on national defense and sanitation. This meeting is to be followed on April 4 by a trip to Fort Devens for an examination of the sanitary works.

DR. FROST'S PAPERS BEING PUBLISHED

THE Commonwealth Fund, of New York, N. Y., has announced that a volume of papers by Wade Hampton Frost, M.D., is now in preparation. The papers have been selected by friends of Dr. Frost and edited by Kenneth F. Maxcy, M.D., successor to Dr. Frost as Professor of Epidemiology at the Johns Hopkins School of Hygiene and Public Health, Baltimore.

The Fund hopes to publish the volume in the spring of 1941.

"THE STATE OF YOUR NATION"

"A REPORT on the State of Your Nation," reprinted from the February and March issues of *McCall's Magazine*, is made available to readers of the *Journal* without charge on request to the Association office. It contains material of interest to health workers.

McCall's for April continues its national defense reporting. Professor C.-E. A. Winslow contributes an article on "The Strength of the Country."

AMERICAN MUSEUM OF HEALTH ANNOUNCES SCIENTIFIC ADVISORY BOARD

IT has been announced by Dr. Louis I. Dublin, Chairman of the Board of Directors of the American Museum of Health, of New York, N. Y., that the Museum has created a Scientific Advisory Board.

The board is comprised of 67 of the nation's outstanding authorities in medicine and public health under the chairmanship of Dr. Haven Emerson, and includes 32 members of the American Public Health Association as follows:

Dr. Leverett Bristol
Dr. Anton J. Carlson
Dr. E. H. L. Corwin
Dorothy Deming
Dr. Rolla Dyer
Dr. Kendall Emerson
Dr. Morris Fishbein
Dr. Thomas Francis, Jr.
Leslie Frank
Dr. Edward S. Godfrey, Jr.
Dr. S. S. Goldwater
Dr. Leonard Greenburg
Dr. John Hardenbergh
Dr. H. E. Kleinschmidt
Dr. A. J. Lanza
Dr. Alfred J. Lotka
Arthur P. Miller
Dr. John Mohler
Dr. Ralph Muckenfuss
Dr. C. W. Munger
Dr. J. Oppie McCall
Dr. Thomas Rivers
Dr. Milton Rosenau
Dr. George Ruhland
Dr. Henry C. Sherman
Dr. W. G. Smillie
Dr. W. F. Snow
Dr. Philip Van Ingen
Dr. Augustus B. Wadsworth
Dr. W. Frank Walker
Dr. C.-E. A. Winslow
Dr. Abel Wolman

OREGON STATE BOARD OF HEALTH REPORTS

IN November, 1940, an investigation of pollution of the Columbia River jointly by the states of Oregon and Washington was undertaken under the direction of the Oregon State Sanitary Authority and the Washington State Pollution Commission. The work at present is being conducted by a field staff consisting of a chemist, a bacteriologist, and a fisheries biologist, who operate under the direction of an Interstate Technical Advisory Committee. This committee consists of Carl E. Green as Chairman, C. M. Everts, Jr., Principal Assistant Sanitary Engineer, as Secretary, and four others as follows:

Dr. William Levin, Director, Hygienic Laboratory, Oregon State Board of Health
Loyd A. Royal, Biologist, Washington State Department of Fisheries
C. F. Pautzke, Biologist, Washington State Department of Game
P. E. Seufer, Assistant Public Health Engineer, Washington State Board of Health

The investigation which is now under way will be conducted for a period of about 1 year or 16 months. The request for such a survey originated from fishermen and fish packing companies on the Columbia River, because of the presence of a slime growth which has been increasing in recent years and which, it is claimed, fouls fishermen's nets and kills salmon. The survey will include an investigation of the D.O., B.O.D., coliform organisms, etc., in addition to this particular slime problem.

The study is also being made to determine the quantity and strength of industrial wastes and municipal sewage being discharged into the river and its principal tributaries. This study is limited to the lower section of the Columbia River from the Bonneville Dam to its mouth. With the rapid expansion of industrial development in this area to make use of power from the Bonneville and Grand Coulee projects, information gathered in such a survey will serve as a valuable source of data in determining the extent of treatment which shall be required of wastes discharged into the Columbia River and its tributaries.

COURSE ON RECENT ADVANCES IN TROPICAL MEDICINE

THE New York Post-Graduate Medical School has announced a course on recent advances in tropical medicine, to be given in New York May 19–23, under the direction of Dr. Z. Bercovitz. The purpose of the course is to bring to physicians a review of the fundamentals of the various subjects in tropical medicine and the more recent advances that have come from research. Authorities in their respective fields will give lectures and demonstrations and opportunities for practical work in clinical parasitology are offered.

Among the subjects to be included are: malaria, yellow fever, intestinal parasites, filariasis, amebic dysentery, bacillary dysentery, tropical skin diseases, kala azar, leptospirosis, relapsing fever, rat bite fever, trichinosis, ecchinococcus, deficiency diseases, lymphogranuloma venereum, sanitary engineering and tropical hygiene.

PAN-AMERICAN LEAGUE AGAINST CANCER ESTABLISHED

THE incorporation of the Pan-American League Against Cancer is announced to carry on in the Western Hemisphere the scientific and social work of the International Union Against Cancer. The latter previously maintained headquarters in Paris, engaging in the fight against cancer on an international scale. Fifty-two countries were affiliated with the International Union.

Professor Francis Carter Wood, of New York, Professor Angel H. Roffo, of Buenos Aires, and Boris Pregel, respectively vice-president, member of the Board of Directors and president of the Finance Committee of the International Union Against Cancer, are organizers of the Pan-American League, with the cooperation of many other persons in the field of cancer throughout the American continent.

The aims of the new organization are:

(a) To promote and encourage the international fight against cancer
(b) To coördinate in the countries of the American continent the scientific study and research in cancer and to publish and disseminate information thereon
(c) To engage in social welfare work in its relation to the problem of cancer
(d) To promote the establishment of national organizations throughout the Western Hemisphere to engage in similar activities.

In furtherance of these objectives, the League hopes to:

Publish a Pan-American Cancer Journal
Organize and maintain a Pan-American center of information and statistics on cancer
Establish a Pan-American system of fellowships
Organize a First Pan-American Cancer Week to be held simultaneously in all the countries of the American continent
Organize a Pan-American Congress for the Scientific and Social Fight Against Cancer, possibly in Buenos Aires in 1942.

KENT COUNTY, MICHIGAN, HEALTH EXHIBIT

THE Kent County Medical Society opened a health exhibit in the Public Museum of Grand Rapids, Mich., January 9. The exhibit will continue for 6 months, the themes to be changed from time to time, covering tuberculosis, pneumonia, cancer, infantile paralysis, allergy, and diabetes.

The auxiliary to the County Medical Society is planning a display of antique medical instruments, the City Health Department one on public health work, and the Kent County Dental Society one on dentistry.

The Women's Field Army of the American Society for the Control of Cancer is coöperating in the exhibits on cancer.

Grand Rapids Junior College is lending a series of charts on anatomy to be used in connection with the exhibits.

William R. Vis, M.D., of Grand Rapids, is chairman of the committee in charge of the exhibit.

CHILD CARE EXHIBIT

AN exhibit dramatizing the care of children from birth to school age, entitled "Your Child and Its Care," opened March 18 in the science department of the Newark Museum, Newark, N. J. It is the fourth in a series of displays on health and medical science arranged in coöperation with the Essex County Medical Society and will remain on view until the middle of May.

The exhibit includes hospital and nursery equipment, models, and photographs, and illustrates the latest methods evolved by science to safeguard the health of children. Most of the material was lent by hospitals and other agencies in the city.

THE ELLEN H. RICHARDS INSTITUTE

THE Trustees of Pennsylvania State College have announced the establishment of the Ellen H. Richards Institute, named in honor of the first woman to receive a degree in chemistry from the Massachusetts Institute of Technology, Ellen H. Richards, 1842–1911. Dr. Pauline Beery Mack, who has been Director of Research in Home Economics at the college since 1935, will direct the Institute.

Research studies in human nutrition, textile technology, in the physics of detergency, and studies on new materials for the construction of houses will be carried on in the Institute.

JESSAMINE WHITNEY

JESSAMINE WHITNEY, statistician on the staff of the National Tuberculosis Association, since 1918, died suddenly in New York, N. Y., on March 11.

In addition to her very substantial contributions of statistical studies and her active participation in the work of a number of American Public Health Association committees, Miss Whitney has served the Vital Statistics Section as Secretary and as Chairman, and has been responsible for the publication of the first and second editions of the Vital Statistics Directory.

PERSONALS

Central States

LIEUT. MARCUS D. BURNSTINE, of Columbus, Ohio, Medical Reserve Officer, has been named Physician in Charge of the Health Service Station for Civilian Employees at the Rock Island Arsenal, succeeding DR. RODERICK G. ST. PIERRE, of Rock Island, Ill., who went to Portland, Ore.

LLOYD K. CLARK,† Director, Division of Engineering, North Dakota State Department of Health, Bismarck, N. D., has received notice that orders are being prepared effective March 15 for active duty with the Sanitary Corps, with headquarters at the 7th Corps Area, Omaha, Nebr., attached to the Corps Area Surgeon's office.

FLOYD M. FELDMAN, M.D.,† Director of Rural Health of District No. 3 of the Minnesota State Board of Health, with headquarters in Rochester, has been appointed part time Deputy of Rochester, effective January 1.

LLOYD H. GASTON, M.D.,† Director of the Sanilac County Health Department, Sandusky, Mich., has been named Director of Local Health Services in the Ohio Department of Health.

DANIEL CAMERON LOCHEAD, M.D., D.P.H.,† Deputy City Health Officer of Rochester, Minn., for 16 years, has resigned, effective April 14.

CLYDE C. SLEMONS, M.D.,* Health Commissioner of Grand Rapids, Mich., from 1910 to 1930, has returned to serve in this position, succeeding JOHN L. LAVAN, M.D.,* who recently resigned to become Health Commissioner of Toledo, Ohio.

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* Fellow A.P.H.A.
† Member A.P.H.A.

W. H. WISELY, Engineer-Manager of the Urbana and Champaign, Ill., Sanitary District, has added to his duties that of serving as the new Executive Secretary of the Federation of Sewage Works Associations. Mr. Wisely has long been active in the sanitary engineering field, having served for the past 4 years as Secretary-Treasurer of the Central States Sewage Works Association. His headquarters address as Executive Secretary of the Federation of Sewage Works Associations is Box 18, Urbana, Ill.

Eastern States

FRANK R. BLAISDELL, who was a District Sanitary Engineer in the Maine State Department of Health and Welfare, entered military service on February 7. He is with the Q. M. Replacement Center, Camp Lee, Virginia.

JOSEPH BRUCE CROOK, M.D., has been appointed Health Officer of East Haddam, Conn.

EDWARD P. DUNNE, M.D., has been named Health Officer of Unionville Borough, Unionville, Conn.

DONALD H. ECKLES, M.D.† of New Castle, Pa., has recently been appointed District Medical Officer, for Beaver, Butler, and Lawrence Counties. On February 15 he was awarded the Degree of Master of Public Health by the University of Pennsylvania.

MILTON A. FEINBERG,† who has been Field Secretary of the Kips Bay-Yorkville District Health Committee on Neighborhood Health Development in New York, N. Y., has joined the staff of the National Refugee Service as a member of the Field Service and Resettlement Department.

KENNETH L. GREVATT, M.D., of Saybrook, Conn., has been appointed Health Officer of Redding, succeeding ALBERT J. TRIMPERT, M.D.

EDWARD A. MCLAUGHLIN, M.D.,† of Providence, R. I., has been appointed Director of the Rhode Island Department of Public Health, Providence, suceeding LESTER A. ROUND, PH.D.* Dr. McLaughlin held the position for a period ending in 1939.

LUCY S. MORGAN, PH.D.,* who has been General Secretary of the Hartford Tuberculosis and Public Health Society, Hartford, Conn., has been appointed head of a new department of health education at Winthrop College, Rock Hill, S. C., effective September 1.

Southern States

JOHN ANDREWS,† formerly in charge of Milk Control Sanitation for the North Carolina State Board of Health, is now with the U. S. Public Health Service, with headquarters in Washington. Mr. Andrews was also formerly Secretary-Treasurer of the Sanitary Engineers' and Sanitation Officers' Section of the Southern Branch of the American Public Health Association.

BATHURST B. BAGBY, M.D.,† of West Point, Va., former Director of the Bureau of Child Health in the State Health Department, has been appointed City Epidemiologist and Chief Health Officer of Richmond on a temporary basis. WILLIAM ARKELL BROWNE, M.D.,† resigned as Epidemiologist and Acting Health Officer to become Health Officer of Alexandria. The position of Health Officer had not been filled since the advent of a new city administration. DR. BAGBY retired from the state service in July, 1940.

JOHN D. FAULKNER,† of Raleigh, N. C., Consultant Engineer in charge of Typhus Control, North Carolina State Board of Health, has just been

* Fellow A.P.H.A.
† Member A.P.H.A.

granted a Degree of M.S. in Public Health Engineering from the University of Michigan.

JAMES H. LE VAN, C.E.,† has been transferred from the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., to Atlanta, Ga., to be Engineer Liaison Officer in the office of the Army's Fourth Corps Area.

KATHLEEN M. LOGAN, R.N.,* has resigned as Supervisor of Rutherford County, Tenn., after 10 years of service, to become Director of Nursing for Puerto Rico. FRANCES DUNHAM, R.N., will succeed Miss Logan after completion of her postgraduate work at Teachers College, Columbia University, New York, N. Y.

JOHN G. NORRIS, M.D., of Farmerville, La., has retired from active practice, to take charge of the Union Parish Health Unit, a position he formerly held.

THOMAS L. OWINGS, M.D., Health Officer of Pearl River County, with offices in Poplarville, Miss., has been appointed to a similar position in Lafayette County, succeeding MURPHY M. SIMS, M.D., of Oxford, who has gone into military service.

RALPH PORGES, Sanitary Engineer, formerly in charge of textile waste treatment studies conducted at Greensboro, N. C., under HERMAN G. BAITY, Sc.D.,* for the Textile Foundation, is now connected with the U. S. Public Health Service, and has been doing stream pollution work on the Tennessee River watershed in cooperation with the State and TVA Sanitary Engineers.

CHARLES O. RAINEY, M.D., of Camilla, Ga., is on leave of absence from the Mitchell County Board of Health, to accept a temporary position as Area Medical Officer of the extracantonment area for Camp Stewart, at Hinesville.

GEORGE D. REED, who has been Assistant Public Health Engineer with the U. S. Public Health Service on the Ohio River Pollution Survey for the past 2 years, accepted a position as Assistant Sanitary Engineer with the Kentucky State Department of Health, effective March 1, and will devote most of his time in the field of industrial hygiene.

CHARLES W. REID, M.D., of Coushatta, La., has been appointed Director of the Red River Parish Health Unit.

IRVING E. SIMMONS, M.D., formerly Director of the Nassau County Health Department in Fernandina, Fla., is the new Health Officer in Coffee County, Ga., with headquarters in Douglas.

Western States

CARL E. GREEN,* of Portland, Ore., State Sanitary Engineer of Oregon, was elected President of the Oregon Section of the American Society of Civil Engineers for 1941.

ROY M. HARRIS, C.E.,† of Seattle, Wash., was called for active duty with the Civil Engineer Corps of the U. S. Navy, and reported the latter part of January. When his term of active duty is ended, it is hoped that he may resume service on the Committee on Shellfish of the Public Health Engineering Section of the American Public Health Association.

DEATHS

DR. EDWARD CLARK, former Health Commissioner of Buffalo, N. Y., died February 28, at the age of 85.

PETER O. SHEA, M.D.,† Director of Public Health of Worcester, Mass., for almost 10 years, died March 9, at the age of 70.

JESSAMINE S. WHITNEY,* Statistician of the National Tuberculosis Association, New York, N. Y., died March 11.

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* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Academy of Political and Social Science. Philadelphia, Pa. April 4–5.

American Association for the Advancement of Science. Durham, N. H. June 22–27.

American Association of Pathologists and Bacteriologists. New York, N. Y. April 10–11.

American Association of Social Workers. Delegate Conference. Philadelphia, Pa. May 30–31.

American College of Physicians—25th Annual Session. Statler Hotel. Boston, Mass. April 21–25.

American College of Surgeons. Hotel Statler, Boston, Mass. November 3–7.

American Home Economics Association—34th Annual Meeting. Stevens Hotel, Chicago, Ill. June 22–26.

American Hospital Association. Atlantic City, N. J. September 15–19.

American Library Association. Annual Meeting. Boston, Mass. June 19–25.

American Medical Association—92nd Annual Meeting. Cleveland, Ohio. June 2–6.

American Physiotherapy Association — 20th Annual Conference. Asilomar, Pacific Grove, Calif. July 13–18. (Graduate Program in Physical Therapy, sponsored by the American Physiotherapy Association. Stanford University Medical School, San Francisco, Calif. June 23–July 18.)

American Public Health Association—70th Annual Meeting. Convention Hall, Atlantic City, N. J. October 14–17.

American Red Cross—National Convention. Washington, D. C. April 21–24.

American Society of Civil Engineers—Spring Meeting. Baltimore, Md. April 23–26.

American Society of Heating and Ventilating Engineers—Summer Meeting. San Francisco, Calif. June 16–20.

American Society of Planning Officials. National Conference on Planning, in coöperation with American Institute of Planners, American Planning and Civic Association, National Economic and Social Planning Association. Philadelphia, Pa. May 11–14.

American Water Works Association—61st Annual Convention. Royal York Hotel, Toronto, Ont., Can. June 22–26.

Indiana Section—Indianapolis, Ind. April 24–25.

Illinois Section—Lincoln Douglas Hotel, Quincy, Ill. April 28–30.

Pacific Northwest Section—Olympic Hotel, Seattle, Wash. May 8–10.

Southeastern Section—Charleston, S. C. May 12–14.

Ohio Section—Gibson Hotel, Cincinnati, Ohio. May 15–16.

Montana Section—Hotel Florence, Missoula, Mont. May 23–24.

Rocky Mountain Section—LaFonda Hotel, Santa Fe, N. M. September 18–19.

Michigan Section—Grand Rapids, Mich. September 24–26.

Minnesota Section—Minneapolis, Minn. October 9–11.

Southwest Section—Fort Worth, Tex. October 13–16.

California Section—Fresno, Calif. October 22–25.

Kentucky-Tennessee Section — Nashville, Tenn. October 27–29.

Four States Section—Baltimore, Md. November 6–7.

Chamber of Commerce of the United States—29th Annual Meeting. Washington, D. C. April 28–May 1.

Child Welfare League of America—Midwest Regional Conference. Chicago, Ill. April 17–19.

Civil Service Assembly:

Eastern Regional Meeting, Washington, D. C.. 3rd week in May.

Central Regional Meeting, Chicago, Ill. May 15–17.

Western Regional Meeting, Los Angeles, Calif. May 26–28.

College Health Workers—3rd Annual Meeting. New Orleans, La. April 11–12.

Colorado Public Health Association. La Junta, Colo. May.

Conference of State and Territorial Health Officers of North America. Washington, D. C. Tentative date: Week of April 28.

Dairy Industries Exposition. Concurrent with annual conventions of the International Association of Milk Dealers, and the International Association of Ice Cream Manufacturers. Automotive Building, Canadian National Exhibition. October 20–25.

Florida Public Health Association. Orlando, Fla. December, 1941.

Food Conference—under the auspices of the Institute of Food Technologists. Pittsburgh, Pa. June 16–18.

Group Health Federation of America—Third Annual Convention. Los Angeles, Calif. June.

Heating, Piping & Air Conditioning Contractors National Association. San Francisco, Calif. June 16–20.

Idaho Public Health Association. Lewiston, Ida. October 6–7.

Institute of Government. University of Southern California, Los Angeles, Calif. June 9–14.

Institute on Industrial Hygiene—for U. S. Public Health Service nursing consultants, and selected nursing representatives of other national agencies. National Institute of Health, Bethesda, Md. April 14–19.

International Association of Public Employment Services. Denver, Colo. June 2–5.

Iowa Public Health Association. Des Moines, Ia. May 8–9.

Michigan Public Health Association. Grand Rapids, Mich. November 12–14.

Missouri Public Health Association. St. Louis, Mo. May 15–17.

National Association of County Officials. Louisville, Ky. May 14–17.

National Association of Purchasing Agents—Governmental Group. Chicago, Ill. May 26–29.

National Association of Housing Officials. Cincinnati, Ohio. April 16–19.

National Conference of Social Work. Atlantic City, N. J. June 1–7.

National Education Association. Boston, Mass. June 29–July 3.

National Foundation for Infantile Paralysis—Medical Committees. Semi-annual Meeting. Foundation Office, 120 Broadway, New York, N. Y. May 15.

National Society for Crippled Children—8th Annual Seal Sale. March 21–April 13.

National Student Health Association—Third Annual Meeting. Flint-Goodridge Hospital, New Orleans, La. April 11–12.

National Tuberculosis Association. 37th Annual Meeting. Hotel Gunter, San Antonio, Tex. May 5–8.

New England Conference on Tomorrow's Children—Second. Littauer Center, Harvard University, Cambridge, Mass. July 16–18.

New England Health Institute—Eleventh. Under the sponsorship of the health departments of each New England state. General Theme: Public Health in National Defense. Hotel Statler, Boston, Mass. April 2–4.

New Mexico Public Health Association. Gallup, N. M. October.

New York State Association of Public Health Laboratories—25th Annual Meeting. School of Medicine, Syracuse University, Syracuse, N. Y. May 19.

Northern Tri-State Medical Association. Tiffin, Ohio. April 8.

Ohio Federation of Public Health Officials. Columbus, Ohio. May 23.

Pacific Heating and Air Conditioning Exposition. Exposition Auditorium, Civic Center, San Francisco, Calif. June 16–20.

Pacific Northwest Regional—Planning Conference. Seattle, Wash. May.

Pennsylvania Public Health Association. Wilkes-Barre, Pa. May 28.

Smoke Prevention Association of America, Inc.—35th Annual Convention. Ansley Hotel, Atlanta, Ga. June 3–6.

Society of Illinois Bacteriologists — Spring Meeting. Board of Trade Building, Chicago, Ill. April 25.

Southern Public Works Congress. Birmingham, Ala. April.

Special Libraries Association. Hartford, Conn. June 16–19.

State Charities Aid Association—State and Local Committees on Tuberculosis and Public Health. Hotel Commodore, New York, N. Y. May 20–21.

Tennessee Public Health Association. Nashville, Tenn. May 19–21.

Western Branch, American Public Health Association—12th Annual Meeting. San Diego, Calif. May 25–29.

Canada

Canadian Federation of Mayors and Municipalities. Ottawa, Ont. June.

Canadian Public Health Association — 30th Annual Meeting. Chateau Frontenac, Quebec, Que. June 9–11.

Foreign

International College of Surgeons. Mexico City, Mexico. August 10–13.

Pan American Medical Association—8th Congress. Buenos Aires, Argentina. 1941.

Second Inter-American Congress of Municipalities. Santiago, Chile. September 15–21.

Have you seen the Nomination Blank on page XXXIX?

MEETINGS OF AFFILIATED SOCIETIES
and A.P.H.A. Branches

Society and Secretary	Next Meeting
ARIZONA PUBLIC HEALTH ASSOCIATION Marion E. Stroud, Room 100, Arizona State Bldg., Phoenix.	Phoenix, April 19–20
COLORADO PUBLIC HEALTH ASSOCIATION Helen Cannon, 3136 York St., Denver, Colo.	La Junta, May 2–3
CONNECTICUT PUBLIC HEALTH ASSOCIATION Mario L. Palmieri, M.D., M.P.H., 43 S. Main St., Middletown	Bridgeport, April 16
CUBAN PUBLIC HEALTH SOCIETY Dr. Carlos Pineiro, Instituto Finlay, Havana, Cuba.	To be announced
FLORIDA PUBLIC HEALTH ASSOCIATION Edward M. L'Engle, M.D., State Board of Health, Jacksonville.	Orlando, December
GEORGIA PUBLIC HEALTH ASSOCIATION Louva G. Lenert, 245 State Office Building, Atlanta.	Atlanta, May 29–31
IDAHO PUBLIC HEALTH ASSOCIATION Herbert C. Clare, State Division of Public Health, Boise	Lewiston, October 6–7
IOWA PUBLIC HEALTH ASSOCIATION Carl F. Jordan, M.D., State Department of Health, Des Moines, Ia.	Des Moines, May
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION G. Donald Buckner, 69 Coolidge Avenue, Needham.	To be announced
MICHIGAN PUBLIC HEALTH ASSOCIATION Marjorie Delavan, State Department of Health, Lansing.	Grand Rapids, November 12–14
MISSOURI PUBLIC HEALTH ASSOCIATION Glen J. Hopkins, 204 N. Boonville Rd., Jefferson City.	St. Louis, May 15–17
NEW MEXICO PUBLIC HEALTH ASSOCIATION Frank W. Parker, Jr., M.D., P. O. Box 1086, Santa Fe, N. M.	Gallup, October
NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION Margaret Blee, Instructor in Nursing Education, University of California, Berkeley, Calif.	To be announced
OHIO FEDERATION OF PUBLIC HEALTH OFFICIALS W. D. Bishop, M.D., Darke County Health Unit, Greenville.	Columbus, May 23
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION C. E. Houston, Department of Public Health, Washington, Pa.	Wilkes-Barre, May 28
PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY Frank Kiernan, 386 Fourth Avenue, New York.	To be announced
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION Ruth George, State Board of Health, Columbia.	Myrtle Beach, May
SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION Eunice Lamona, R.N., 6028 Harcourt Ave., Los Angeles.	To be announced
TENNESSEE PUBLIC HEALTH ASSOCIATION Dr. Robert H. Hutcheson, State Department of Health, Nashville.	Nashville, May 19–21
TEXAS PUBLIC HEALTH ASSOCIATION Alan C. Love, 303 West 15 Street, Austin.	To be announced
UTAH PUBLIC HEALTH ASSOCIATION S. E. Gilchrist, 105 South State St., Salt Lake City, Utah.	To be announced
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION Dorothea Campbell, State Department of Health, Charleston.	To be announced
SOUTHERN BRANCH, A.P.H.A. P. E. Blackerby, M.D., 559 Sunnyside Drive, Louisville, Ky.	To be announced
WESTERN BRANCH, A.P.H.A. W. Ford Higby, 45 Second Street, San Francisco, Calif.	San Diego, Calif., May 26–30, 1941

Request for Application for Membership

I wish to apply for membership in the American Public Health Association. Please send me an application blank.

Name.....

Print name in full and give degree

Street and City..... State.....

For correspondence and the Journal

Present public health occupation.....

REQUIREMENTS. Persons professionally engaged or interested in public health work are eligible for election as Members of the Association.

DUES: Dues of Members are $5.00 per year, which includes an annual subscription to the **AMERICAN JOURNAL OF PUBLIC HEALTH.** Persons joining the Association after July 1 are requested to pay $7.50, covering a year and one half from July, 1941, to December, 1942.

AMERICAN PUBLIC HEALTH ASSOCIATION
1790 BROADWAY AT 58TH STREET, NEW YORK, N. Y.